DE-7200 Centrifuge
Variable Frequency Drive

Issued 30 Oct 09 **Rev 01 Jan 14**

Maintenance & Operation Manual

DISCLAIMER

Derrick Corporation has taken care to ensure that all of its maintenance and operation manuals are accurate. However, we offer no guarantees or warranties in this regard. Our manuals are provided only as a guide to assist with the maintenance and operation. Derrick Corporation takes no responsibility for any losses, damage, or injuries that may occur as a result of using any of our manuals.

It is ultimately the operator's responsibility to ensure that the operation, repair, and maintenance of equipment complies with all applicable national and local regulations, including safety regulations.

THIS MANUAL IS PROVIDED BY DERRICK CORPORATION ON AN "AS IS" BASIS AND DERRICK CORPORATION EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL DERRICK CORPORATION BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER WITH RESPECT TO THE MANUAL AND EQUIPMENT.

Derrick Equipment Company
15630 Export Plaza Drive
Houston, Texas 77032
Phone: 281.590.3003
Toll Free: 1.866.DERRICK
Fax: 281.442.6948
www.derrickequipment.com

UNIT NUMBER IS KEY TO DERRICK SERVICE

All inquiries to Derrick must include the equipment unit number. The stainless steel unit number tag attached to each piece of Derrick equipment is your key to efficient service and support.

Typical Derrick Unit Number

This unique number gives vital information to Service personnel who use it to identify the correct parts when filling orders, provide accurate responses to service questions, track documentation, and trace the equipment's history or configuration. In short, the **unit number provides the critical information needed to ensure that Derrick customers receive the best possible service**.

The unit number consists of a two-character alphabetic prefix that identifies the equipment type and a series of numeric characters that signify the sequence of the machine's manufacture. For example, unit number MA000001 would be the first screening machine manufactured by Derrick. Alphabetic prefixes currently in use are:

MA - Screening Machine	AD - Desilter and Desander
DG - Degasser	AG - Mud Agitator
CF - Centrifuge	SF - Screen Frame

To ensure that it will remain intact over many years of rigorous service, the heavy-gage tag is riveted to a structural member such as the shaker support structure. It is not to be confused with any other identifier on the machine such as a vibrator motor serial number.

For convenient availability, the unit number is also recorded in the Operation and Maintenance manual shipped with the equipment. When contacting Derrick for any equipment question or need, always have the unit number in your possession. It's the best way to get the most efficient service from our dedicated Service and Engineering personnel.

ABOUT THIS MANUAL

In this electronic manual, all sections and paragraphs listed in the CONTENTS are linked to the corresponding text.

Navigate the electronic manual as follows:

1. **To view any desired information, display the CONTENTS page and move the cursor to the desired paragraph or section title.**
2. **To display the desired information, click on the listing when the pointing finger appears over the text.**
3. **When finished viewing the text, press Alt + left arrow key to return to the CONTENTS page.**
4. **If desired to return to the same information, press Alt + right arrow. To locate a different item, repeat steps 1 and 2.**
5. **Blank pages are included to facilitate accurate two-sided printing on a standard copier. To print any individual section, simply enter the PDF page number range at the top of the screen (not the page number at the bottom of each page).**

CONTENTS

CONTENTS

SECTION 1 - INTRODUCTION

OVERVIEW

This manual provides instructions for installing and operating the DE-7200 Variable Frequency Drive (VFD) centrifuge (Figure 1-1). The manual is divided into several sections to assist the user in readily accessing the information. Instructions include description, theory of operation, safety, installation, and maintenance. Reference drawings are provided to facilitate parts location and ordering, as well as for understanding of equipment operation and assist in troubleshooting. The manual also contains technical documentation provided by outside suppliers. These documents cover components used in the centrifuge but not manufactured by Derrick.

Figure 1-1 DE-7200 Variable Frequency Drive (VFD) Centrifuge

SAFETY

Section 2 of this manual contains relevant safety information for both operation and maintenance of this equipment. Be sure this information is read and understood by all personnel.

DO NOT operate the equipment if defective or faulty mechanical or electrical components are detected.

SOUND EMISSION

Hearing protection is recommended when working on or near the centrifuge. Based on measurements taken for technically comparable machinery, the centrifuge emits the following airborne sound levels:

- A-Weighted Machine Surface-Averaged Sound Pressure Level at 1m – 90.9 dBA
- A-Weighted Machine Surface-Averaged Sound Power Level – 109.8 dBA
- C-Weighted Instantaneous Peak Sound Pressure Level – 111.4 dBC

EQUIPMENT USE

The DE-7200 VFD centrifuge is designed for removing low and high specific gravity solids from slurries. In one type of processing, solids are removed and the liquid is returned for recirculation. Alternatively, solids are returned to the active system and the liquid is discarded or processed by a second centrifuge.

Derrick Corporation does not authorize any other use of this equipment. Intended usage of the equipment includes compliance with the operating, maintenance, and safety procedures included in this manual.

DESCRIPTION

Major components of the centrifuge (Figure 1-2) consist of the rotating assembly (bowl, conveyor, and conveyor drive gearbox), bowl and conveyor drive motors, control cabinet, purge unit, vibration switch, and case and base. The following paragraphs describe these components.

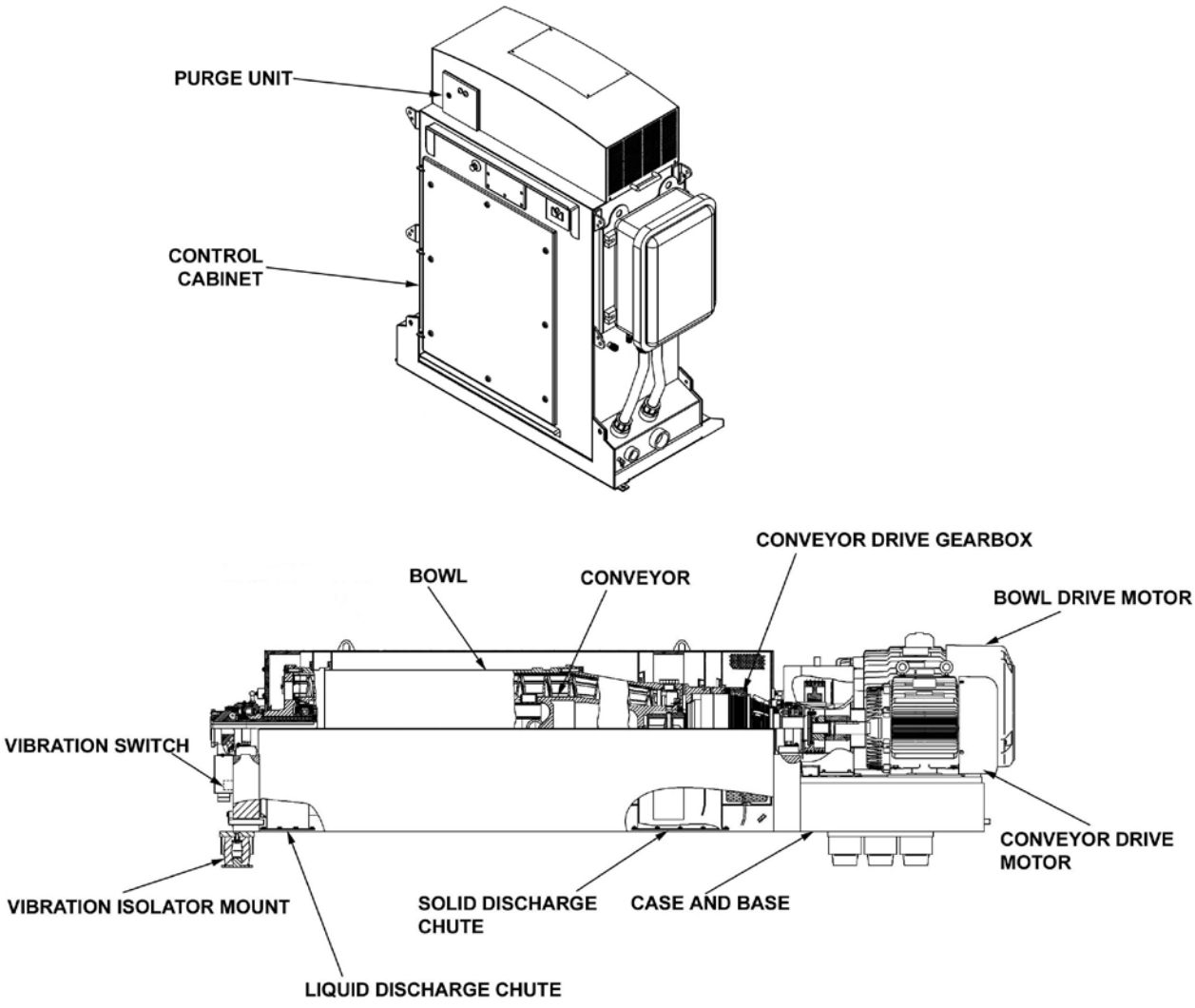


Figure 1-2 DE-7200 VFD Centrifuge Major Components

Rotating Assembly

The rotating assembly consists of a cylindrically shaped, bowl, conveyor assembly, gearbox, and related components. The bowl consists of a straight cylinder with a conical section at the solid discharge end and a flat liquid bowl head at the opposite end. Openings are provided at both ends to permit liquid and solid discharges. The bowl ends are supported by roller bearings having grease fittings to facilitate periodic lubrication.

Bowl Assembly

The liquid bowl head at the liquid discharge end contains movable weir plates that permit manual adjustment of the liquid level remaining in the bowl during rotation. Notched locking plates adjacent to the weir plates facilitate precise adjustment. Although they are individually adjustable, all plates must be set at the same level. The liquid level or pond depth, along with other factors, helps determine the liquid content of the discharged solids. The conical bowl at the solid discharge end forms an upward sloping beach, where solids are dried and continuously discharged through the solid discharge ports. Replaceable inserts line the solid discharge ports to minimize the rate of wear due to abrasive action.

Conveyor

The conveyor assembly is a hollow, cylindrical auger that receives the inlet slurry into its interior, disperses it through feed nozzles to the bowl assembly, and transports the solids to the solids discharge outlets. An electric motor connected to the input shaft of a three-stage planetary gearbox turns the conveyor in the same direction as the bowl but at a higher rate of speed. The outer housing of the gearbox is secured to the bowl, while the output shaft is directly connected to the conveyor.

The differential speed setting on the control panel determines the conveyor speed in relation to the bowl speed. This relationship remains consistent; as bowl speed is varied, the conveyor speed varies commensurately but maintains the differential relationship. For example, a bowl speed of 2000 RPM and a conveyor differential speed of 10 results in the conveyor rotating at a rate of 2010 RPM.

The feed tube at the liquid discharge end directs inlet slurry into the interior of the conveyor, which rapidly disperses the material through feed nozzles into the bowl. Replaceable inserts line each of the six feed nozzles to minimize wear due to abrasive action. A roller bearing supports the conveyor at the liquid bowl head, while at the solid end the conveyor is supported by the bearings that are integral to the conveyor drive gearbox.

Conveyor Drive Gearbox

The conveyor drive gearbox is a three-stage planetary gearbox that rotates the conveyor at a faster speed than the bowl assembly. The gearbox is mounted on, and consequently driven by, the bowl assembly, Input and output shafts of the gearbox are supported by internal bearings. The conveyor drive motor is coupled to the gearbox input shaft by a flexible coupling, which permits compliance with slight alignment variations. The gearbox contains a gear system that transfers rotation from the motor and bowl to the conveyor's output shaft.

The input shaft end of the gearbox is supported by the solid end main bearing, while the output end is secured to the bowl. The gearbox ratio of 49:1 turns the conveyor at a proportionally faster rate than the bowl assembly. The control system ensures that the conveyor's rotational speed varies directly with bowl speed, maintaining a consistent differential relationship for solids conveyance.

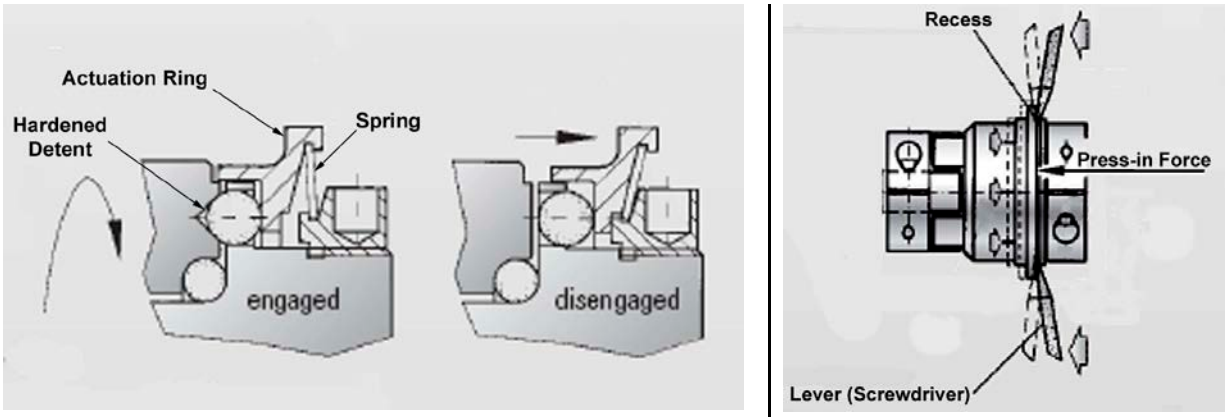
During an overload condition, excessive solids in the conveyor may overburden the motor or gearbox, causing motor torque to increase and resulting in an overload alarm. If the conveyor's

pre-set torque limit is reached, the control system automatically reduces the feed rate to enable the conveyor to clear the excess solids. When the centrifuge is operating at the reduced feed rate, the Operation screen displays a message to inform the operator of the modified status. Unless the over-torque condition is removed, the centrifuge will be shut down automatically.

Conveyor Drive Gearbox (Cont'd)

If a sudden overload torque condition occurs, the conveyor drive clutch mechanically disengages the conveyor drive motor to protect the gearbox (Figure 1-3) from damage. Following disengagement, the centrifuge must be shut down and the clutch manually reset as follows:

- Align both clutch halves at one of the marks on the actuation ring and body.
- Insert a screwdriver blade between the actuation ring and adjustment nut in two places 180° apart, and press ring back into engagement position.



Disengagement **Re-Engagement**

Figure 1-3 Conveyor Drive Clutch Operating Principles

Drive Motors

The centrifuge is configured to operate on a designated AC voltage supplied in three-phase, 50Hz or 60Hz. The machine is operated by two inverter-duty, three-phase, explosion-proof electric motors. A 150HP bowl drive motor is connected to the bowl assembly by a sheave and series of drive belts, while a 60HP electric motor is directly coupled to the gearbox input shaft by a clutch coupling. A protective guard covers the sheaves, drive belts, and conveyor drive clutch coupling for personnel protection.

Control Cabinet

All electric power distribution and control system components required for centrifuge operation are installed in the control cabinet. Incoming power energizes the VFDs that supply the varying output power for operation and control of the bowl, conveyor, and pump drive motors. A step-down transformer adjusts incoming power to the 115 to 120Vac power required for operation of the PLC and operator control panel. The transformer also energizes the 24Vdc power supply that produces the required DC power for operation of control system components. An Ethernet communication network permits two-way data transfer between the PLC, VFDs, and operator control panel.

The cabinet air conditioner maintains a suitable environment for efficient operation of the VFDs and other power and control components. The air conditioner is a conventional refrigeration unit consisting of a compressor, condenser, and evaporator. The PLC uses the temperature input provided by an RTD sensor to cycle the air conditioner on and off as required to maintain the interior temperature within a range of 85°F to 95°F (29°C to 35°C). When the temperature rises to

the upper setpoint, the compressor and condenser motors are cycled on to provide cooling. Upon reaching the low temperature setting, the air conditioner is shut down. The evaporator fan operates continuously whenever the cabinet is energized to maintain a continuous flow of conditioned air over cabinet components.

Purge System (Hazardous Environment Only)

For operation in a hazardous environment, the control cabinet is equipped with a purge system. The purge system ensures that the cabinet interior remains free of potentially hazardous gases by filling the cabinet with filtered air and maintaining positive pressure to exclude ambient gases. During startup, before power is permitted to enter the cabinet, the cabinet purge system initiates a 16-minute rapid purge cycle at 16CFM. When the rapid purge cycle is completed, the purge system automatically closes a switch that supplies power to the cabinet.

Following the rapid purge, the purge system maintains a positive pressure inside the cabinet to exclude any potentially hazardous gases. Minimum pressure and purge flow sensors will shut down power if the purge system is not maintaining satisfactory pressure in the cabinet. For further details of purge system operation, refer to Section 4.

Vibration Switch

The vibration switch (Figure 1-4) is a safety device designed to protect personnel and equipment by shutting down the centrifuge in case of excessive vibration. Normally, the switch contacts are held closed by a magnetic latch. However, strong vibration or a shock of 2 Gs will overcome the magnetic latch, causing the switch armature to break away from the normally closed position, providing an input to the PLC. A reset button on the side of the switch must then be manually pressed to close the contacts and re-engage the magnetic latch.

WARNING! EXCEEDING THE 2 G SETTING CAN CAUSE INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT. DO NOT RAISE THE SETTING.

The vibration switch is mounted on the centrifuge base in an orientation that is most affected by out-of-balance vibration of the bowl assembly. Clogging of the conveyor or worn bearings may produce sufficiently high vibration to trip the switch.

Figure 1-4 Vibration Switch

Case and Base

When the top cover is closed, the case provides a sealed, protective enclosure that fully surrounds the bowl assembly. The liquid discharge chute and solid discharge chute are installed at the bottom of the lower case half. Mating baffles installed inside the top and bottom case halves separate the solid and liquid phases. Bolts secure the top and bottom halves together; a gasket in the bottom case half seals the two halves.

The case is bolted onto the welded steel base assembly, which contains mounting provisions for the bearing pillow blocks. The base assembly supports the centrifuge components and contains hollow rubber vibration isolators that engage with centering pins attached to the mounting platform.

MECHANICAL OPERATION

The centrifuge receives slurry at the liquid discharge end of the machine. For best performance, the slurry should be screened to 74 microns in vibrating screening machines before being fed to the centrifuge. The slurry flows through a feed tube into the rotating bowl, where centrifugal force separates liquid from the solids. Liquid flows out the liquid discharge connection, while solids are conveyed to the solid discharge where a chute should be installed to receive the material.

G forces produced by the high-speed rotation of the cylindrical bowl separate solids from the feed slurry. Centrifuge performance is based on three variable factors:

- G force exerted on the fluid - Gravitational force pulling fluid against the outside wall of the centrifuge
- Retention time in the centrifuge - The longer the slurry remains in the centrifuge the smaller the particle that can be separated
- Differential speed of conveyor - The faster the conveyor rotates, the wetter the solids and the more solids that can be discharged

All three factors may be manipulated to alter the liquid and solids discharge. The G force is adjusted by varying the bowl RPM. Retention time is controlled by adjusting the weir plates on the liquid bowl head to change the pond depth (liquid level), and the conveyor differential speed (difference between the bowl and conveyor speeds) may be adjusted on the operator control panel. Bowl speed and differential speed are adjusted on the operator control panel, which continuously displays current operating conditions.

All parameters other than pond depth may be changed quickly and easily while the centrifuge is operating. These adjustments permit the operator to optimize efficiency in response to varying feed conditions. Another method of altering the discharge results is to change the feed rate. For best performance, the slurry should be screened to 74 microns in vibrating screen machines before passing it to the centrifuge for processing.

During centrifuge operation, slurry is pumped through the feed tube into the center of the rotating conveyor (Figure 1-4), where it splashes against the feed accelerator. The slurry is accelerated to the bowl speed and then dispersed out six feed nozzles on the periphery of the conveyor cylinder into the bowl, which rotates at a slower speed than the conveyor.

As the slurry flows in the channels between the conveyor flights, the heavy particles settle at an accelerated rate due to the G force imposed by the rotating bowl. Sand particles settle almost instantly; then the finer, lighter particles settle. Particles that cannot be settled under the present settings will be discharged with the liquid through the adjustable weirs on the liquid bowl head. Liquid exiting the liquid bowl head is directed through the liquid discharge outlet.

The settled solids form a cake inside the bowl and are transported by the conveyor toward the narrow end of the bowl (beach). As the solids travel across the beach, their free liquid film is lost due to centrifugal squeezing and drainage, and they are discharged at high velocity through the solid discharge ports on the bowl.

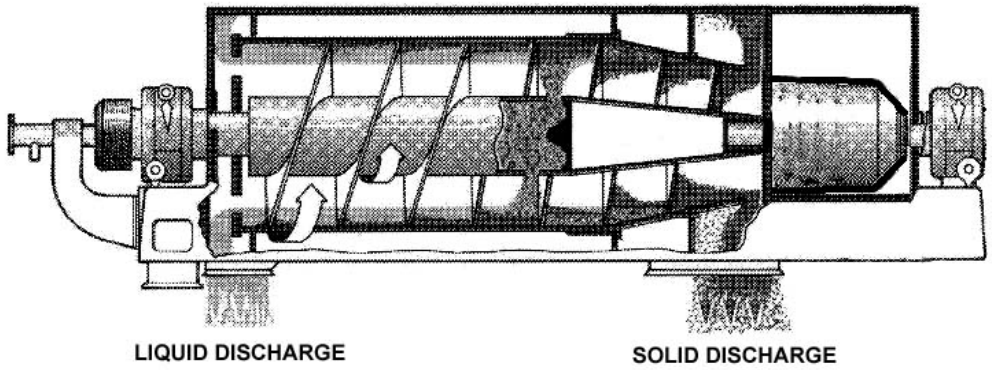


Figure 1-4 Centrifuge Operation

CONTROL SYSTEM

Centrifuge operation is supervised by a programmable logic controller (PLC) that interfaces with the variable frequency drives (VFDs) supplying power to the bowl, conveyor, and feed pump drive motors. Monitoring and control of the centrifuge may be performed locally or remotely. The environmentally hardened PLC also offers short-term data storage and a high degree of operating flexibility. The operator control panel mounted on the control cabinet facilitates communication with the VFDs and provides real-time access to system operating characteristics. Through the control panel, the operator may start the centrifuge, enter and adjust speed and torque limits for bowl and conveyor, set feed rate, shut down the machine, and perform a variety of monitoring and control functions.

Various inputs including main bearing temperatures, bowl speed, bowl and conveyor torques, cabinet interior temperature, and vibration are transmitted to the PLC, which then responds with corresponding outputs to govern centrifuge operation. Critical status information is displayed on the control panel, as well as alarm and fault messages that inform the operator of any anomalies. In case of a serious malfunction, the PLC automatically shuts down the centrifuge and displays an explanatory message for the cause of the shutdown. In addition, the operator may shut down the centrifuge at any time due to an emergency.

The feed pump is controlled by the PLC, which raises and lowers feed rate to accommodate the maximum flow and torque limits set by the operator. Flow rate is increased within the set limit until the torque limit setting is reached. Generally, for maximum throughput flow priority governs centrifuge operation. However, the PLC defaults to torque priority upon reaching the torque limit setting. Once torque priority is entered, the system will remain in torque priority even if feed conditions cause the torque to fall, until flow priority is re-selected by the operator.

The system's flexibility permits the PLC to raise the feed rate automatically to the set limit unless the torque limit is reached by either the bowl or conveyor drive motor. Consequently, if feed slurry properties change, causing the torque to rise, the PLC reduces the feed rate to stay under the torque limit. The operator control panel displays which priority (flow or torque) is currently in force.

PRODUCT SUPPORT

Derrick Corporation offers 24-hour per day, 7-day per week product support. Product support includes screen replacement / ordering information and repair / replacement parts and service for the entire product line. Refer to the following table for the parts / service center nearest you.

PARTS SALES & SERVICE LOCATIONS
Colorado
Grand Junction - 970.241.2417
Louisiana
Broussard - 877.635.3354
New York - Corporate Headquarters
Buffalo - 716.683.9010
Oklahoma
Oklahoma City - 405.208.4070
Texas
Houston (Oilfield Headquarters) - 866.DERRICK (337.7425) • 281.590.3003
North Texas (Bridgeport) - 405.208.4070
South Texas (Corpus Christi) - 361.299.6080
West Texas (Midland) - 405.397.4089
East Texas, Arkansas, and Louisiana - 281.546.1166
Wyoming
Casper - 307.265.0445
North Dakota
Williston - 701.572.0722

CONTACT INFORMATION

Location	Telephone	Facsimile (FAX)	E-Mail / Website
Derrick Corporation 590 Duke Road Buffalo, New York 14225 USA	716.683.9010	716.683.4991	General Service Manager *toconnor@derrickcorp.com*

SECTION 2 - SAFETY

GENERAL

This section contains a summary of WARNINGS used in this manual and a list of material safety data sheets (MSDSs) applicable to the equipment. The centrifuge has been designed to perform the stated functions safely.

WARNINGS

All persons responsible for operation and maintenance of this equipment must read and understand all safety information in this manual prior to operating and/or maintaining the equipment. The safety warnings listed below are included in applicable procedures throughout this manual.

Work Area

	**WARNING! ALWAYS BE AWARE OF WORK AREA HAZARDS TO PROTECT AGAINST SLIPS, TRIPS, AND FALLS WHEN WORKING ON OR NEAR THIS EQUIPMENT.**
	**WARNING! LOUD NOISE! WEAR HEARING PROTECTION AT ALL TIMES WHEN WORKING ON OR NEAR THIS EQUIPMENT.**
	**WARNING! VISION HAZARD! SAFETY GLASSES MUST BE WORN AT ALL TIMES WHEN WORKING ON OR NEAR THIS EQIPMENT TO PREVENT SERIOUS EYE INJURY OR PERMANENT LOSS OF VISION.**

Electrical Hazards

	**DANGER! HIGH VOLTAGE! SHUT DOWN, LOCK OUT, AND TAG OUT ELECTRIC POWER, AND ENSURE THAT EQUIPMENT HAS STOPPED ROTATING BEFORE WORKING ON THIS EQUIPMENT. IF THE INPUT POWER IS SPLIT, BE SURE THAT PHASING IS CORRECT BEFORE APPLYING POWER TO CENTRIFUGE.**
	**DANGER! USE EXTREME CAUTION WHEN OPERATING CENTRIFUGE WITH PURGE SYSTEM BYPASSED. DANGEROUSLY HIGH VOLTAGE WILL BE PRESENT IN CONTROL CABINET IF DOOR IS OPENED WHILE POWER IS APPLIED.**
	**WARNING! DRIVE MOTOR MUST BE OPERATED AT THE DESIGNATED SUPPLY VOLTAGE.**

	**WARNING! ELECTRICAL CONNECTIONS MUST BE MADE IN ACCORDANCE WITH ALL APPLICABLE NATIONAL AND LOCAL CODES. FAILURE TO COMPLY MAY RESULT IN AN UNSAFE CONDITION THAT COULD INJURE PERSONNEL OR DAMAGE EQUIPMENT. ENSURE THAT ALL ELECTRICAL AND CONDUIT CONNECTIONS ARE SECURE.**

Equipment Handling

	**WARNING! TO ENSURE PROPER BALANCE AND ORIENTATION WHEN UNIT IS RAISED AND PREVENT DAMAGE TO COMPONENTS, ATTACH LIFTING SLING ONLY AT DESIGNATED LIFT POINTS. DO NOT ATTEMPT LIFTING BY ATTACHMENT TO MOTOR OR ANY OTHER LOCATION.**
	**WARNING! BE SURE THAT HANDLING DEVICES HAVE SUFFICIENT LIFTING CAPACITY TO SAFELY HANDLE THE WEIGHT OF THE EQUIPMENT.**
	**WARNING! WHEN USING AN OVERHEAD LIFTING DEVICE, USE ALL FOUR LIFTING POINTS PROVIDED.**
	**WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL EQUIPMENT HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.**
	**WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO HANDS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.**

Operation

	**WARNING! ALL OPERATING AND MAINTENANCE PERSONNEL MUST READ AND UNDERSTAND ALL SAFETY INFORMATION IN THIS MANUAL BEFORE WORKING WITH THE EQUIPMENT.**
	**WARNING! BE SURE THAT TOP COVER IS CLOSED AND SECURED AND ALL PERSONNEL ARE CLEAR BEFORE STARTING MACHINE.**
	**WARNING! BEFORE STARTING CENTRIFUGE, BE SURE THAT ALL SHIPPING BRACKETS HAVE BEEN REMOVED AND BEARING PILLOW BLOCKS ARE PROPERLY TIGHTENED.**
	**WARNING! ALWAYS ALLOW MACHINE TO COAST TO A COMPLETE STOP BEFORE OPENING TOP COVER OR REMOVING GUARDS.**
	**WARNING! DO NOT OPERATE CENTRIFUGE IF EXCESSIVE NOISE OR VIBRATION DEVELOPS. ALWAYS CONFIRM THAT VIBRATION SWITCH AND OTHER SAFETY DEVICES ARE FUNCTIONAL.**

WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO HANDS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.

Maintenance

DANGER! HIGH VOLTAGE! SHUT DOWN, LOCK OUT, AND TAG OUT ELECTRIC POWER, AND ENSURE THAT EQUIPMENT HAS STOPPED ROTATING BEFORE WORKING ON THIS EQUIPMENT.

WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO HANDS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.

DANGER! EXPLOSION HAZARD! BE CERTAIN THAT SURROUNDING ATMOSPHERE IS CLEAR OF ALL POTENTIALLY EXPLOSIVE GASES BEFORE OPENING CONTROL CABINET DOOR.

Storage

WARNING! CENTRIFUGE MAY BE DAMAGED BY STORING IN A HIGH HUMIDITY ENVIRONMENT (GREATER THAN 50% RH). EQUIPMENT MUST BE STORED IN A LOW-HUMIDITY ENVIRONMENT.

MATERIAL SAFETY DATA SHEETS (MSDS'S)

Material Safety Data Sheets (MSDSs) advise personnel of the properties and any possible hazards associated with these materials. Emergency first aid procedures, special precautions, emergency telephone number, and other relevant data are contained in the MSDSs. These documents are prepared by the product manufacturers, which have sole responsibility for accuracy of the information.

The MSDSs listed below apply to products used in the manufacture of the Derrick equipment. Where shown, dates are current as of the publication date of this manual. The latest MSDSs may be obtained from the product manufacturer.

MSDS'S (CONT'D)

MATERIAL DESCRIPTION - WHERE USED	MSDS / Date
Paints	
PPG Dimetcote 302H Green 302F0250 Resin - Top Coat	1302H-5A / 04-11-10
PPG Dimetcote 302H Clear 302G0910 Cure - Top Coat	1302H-B / 01-21-10
PPG PSX 700 Neutral Tint Resin - Undercoat	PX700T3 / 02-28-08
PPG PSX 700FD Cure - Undercoat	PX700FD-B / 01-11-07
Lubricants	
Shell Albida EP2 - Main & Conveyor Bearings	57089L / 06-18-09
Exxon Mobil SHC 629 - Conveyor Drive Gearbox	Mobil SHC 629 / 01-13-09
Exxon Mobil Polyrex EM - Bowl & Conveyor Drive Motors	Polyrex EM / 06-01-05
Sealant	
Loctite 243 Anti-Seize Lubricant - Fasteners	76764 / 05-27-09

SECTION 3 - INSTALLATION

GENERAL

This section describes the recommended installation procedure for the DE-7200 VFD centrifuge. The centrifuge is shipped fully assembled. For safety during shipment, however, the rotating assembly is supported by shipping brackets. It must be lowered onto the base and then its bearing pillow blocks secured to the base.

SAFETY

Read and understand **ALL** safety information presented in this manual **before** installing and operating this equipment. Refer to Section 2 for a summary of Warnings addressing installation, operation, and maintenance of this equipment.

Before beginning the installation, review the equipment handling procedures in this section. Failure to observe proper equipment handling procedures may result in serious personal injury or death and/or damage to the equipment.

	**WARNING! TO ENSURE PROPER BALANCE AND ORIENTATION WHEN UNIT IS RAISED AND PREVENT DAMAGE TO COMPONENTS, ATTACH LIFTING SLING ONLY AT DESIGNATED LIFT POINTS. DO NOT ATTEMPT LIFTING BY ATTACHMENT TO ANY OTHER LOCATION.**
	**WARNING! BE SURE THAT HANDLING DEVICES HAVE SUFFICIENT LIFTING CAPACITY TO SAFELY HANDLE THE WEIGHT OF THE EQUIPMENT. LOWER THE CENTRIFUGE GENTLY INTO PLACE, AS JARRING MAY CAUSE DAMAGE.**
	**WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL CENTRIFUGE HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.**
	**WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.**

TOP COVER OPENING/CLOSING PROCEDURES

The proper procedures for opening and closing the top cover of the centrifuge must always be followed. Two operators using both hands are required to open the cover. Derrick recommends having a hoist available if additional assistance is desired during the opening/closing of the centrifuge cover. To open and close the cover, proceed as follows:

1. Shut down, lock out, tag out electric power to centrifuge, and allow rotating assembly to coast to a full stop.
2. Remove bolts securing cover to base.
3. Have two operators using both hands grip the cover handles securely to ensure full control of the cover throughout the opening and closing process.
4. As the cover is raised, ensure that body limbs of all personnel and any other items remain clear of the cover gap at all times.
5. Raise the cover to the fully opened position, and insert a 1/2" (12.7mm) hardened steel pin through one hinge to lock the cover open.
6. After performing the activity that required the cover to be opened, reverse steps 2 through 5 to close the cover. During the closing procedure, ensure that both operators are capable of controlling the cover's descent and that all body limbs and other items remain clear of the gap.

STORAGE

If the centrifuge will be stored for more than 6 months before installation, the control cabinet, rotating assembly, and motors should be preserved as described in the following paragraphs.

Control Cabinet

For protection against weather and dust, the cabinet should be covered with a tarpaulin (tarp) and stored indoors under the following environmental conditions:

Temperature - 50°F to 86°F (10°C to 30°C)

Relative Humidity - 20% to 50%

If cabinet will remain in storage for an extended period prior to initial startup, proceed as follows:

1. Power up the cabinet every 6 months and maintain power for 1 to 2 hours.
2. To maintain low humidity inside the cabinet, either place a replaceable desiccant or small heating source (such as an incandescent light bulb) inside the cabinet.

Rotating Assembly and Motors

For protection against weather and dust, the centrifuge should be covered with a tarp and stored indoors under the following environmental conditions:

Temperature - 50°F to 86°F (10°C to 30°C)

Relative Humidity - 20% to 50%

The following procedures apply to long-term storage of the centrifuge:

1. Lower the rotating assembly onto the base as described later in this section.
2. Leave main drive V-belts un-tensioned.
3. Every 3 months, manually rotate the bowl assembly at least 20 times, while restraining conveyor motor from rotating; then re-grease main and conveyor bearings.
4. Manually rotate bowl and conveyor motor shafts 5 to 10 revolutions every 3 months of storage. If stored more than 1 year, re-grease motor bearings before initial startup.
5. If motors are equipped with internal heaters, power should be applied and heaters energized.

INSTALLATION SEQUENCE

Following is the sequence of steps for installing the centrifuge. The sequence presented may vary depending on the user's facilities and previous experience with this type of equipment.

1. Read and understand all safety information in Section 2 before installing and operating this equipment.
2. Read and understand the equipment handling procedures in this section before lifting and positioning the equipment.
3. Position and level equipment at installation site.
4. Remove shipping components, and lower and secure the rotating assembly bearing pillow blocks to the base.
5. Adjust drive belt (refer to Section 5).
6. Connect liquid discharge line.
7. If discharge duct is to be used, connect duct to solids discharge chute.
8. Install flexible joint, feed tube, and piping connections for slurry feed, polymer injection, fresh liquid cleanout, and sampling port.
9. Select and install feed pump.
10. Connect electric power supply to the equipment, and connect bowl motor, conveyor motor, and feed pump motor to terminal blocks inside control cabinet.
11. Connect sensor cable to sensor junction box.
12. For explosion-proof cabinet, connect compressed air supply source to purge unit.
13. Refer to Section 4 for startup and operating procedures.

REQUIRED CLEARANCES AND POSITIONING

Sufficient space should be provided around the equipment to facilitate access for maintenance, inspection, and adjustment.

Typical operation and maintenance functions include the following activities:

1. Access and operate the system control panel.
2. Open and close the control cabinet door (Figure 3-1).
3. Open and close top cover.
4. Grease rotating assembly bearings.
5. Check and fill gearbox.
6. Connect and disconnect feed and liquid discharge lines.
7. Remove and install feed tube.

REQUIRED CLEARANCES AND POSITIONING (CONT'D)

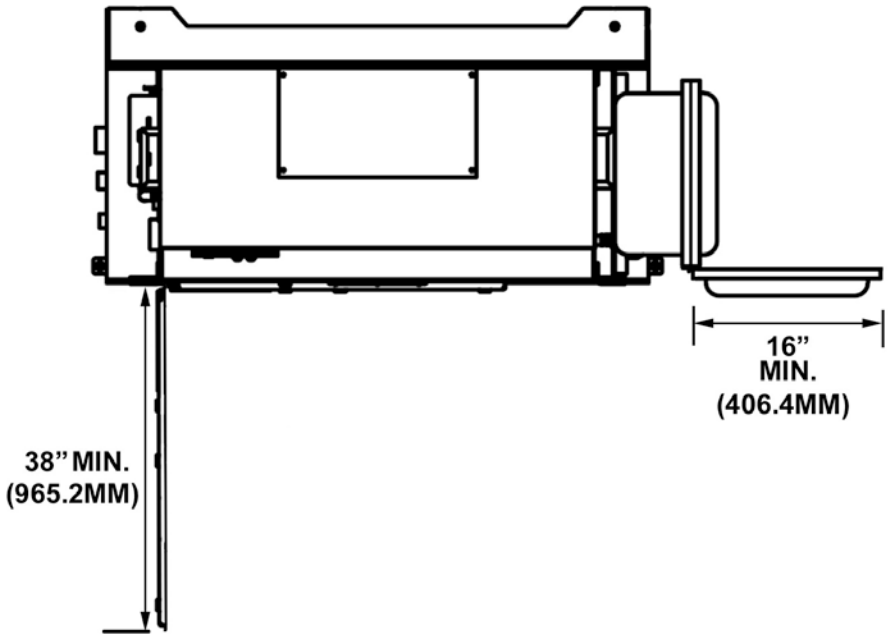


Figure 3-1. Required Opening Clearances for Cabinet Door and Electrical Panel

EQUIPMENT HANDLING

⚠	**WARNING! TO ENSURE PROPER BALANCE AND ORIENTATION WHEN UNIT IS RAISED AND PREVENT DAMAGE TO COMPONENTS, ATTACH LIFTING SLINGS ONLY AT DESIGNATED LIFT POINTS. DO NOT ATTEMPT LIFTING BY ATTACHMENT TO ANY OTHER LOCATION.**
⚠	**WARNING! BE SURE THAT HANDLING DEVICES HAVE SUFFICIENT LIFTING CAPACITY TO SAFELY HANDLE THE WEIGHT OF THE EQUIPMENT.**
⚠	**WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL EQUIPMENT HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.**
⚠	**WARNING! WHEN USING AN OVERHEAD LIFTING DEVICE, USE ALL FOUR LIFTING POINTS PROVIDED.**
⚠	**WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.**

The centrifuge and control cabinet are shipped fully assembled and installed on shipping skids. A label indicating the weight of each unit was affixed to the machine. Refer to the general arrangement drawing in Section 8 for equipment weights and other technical data.

While the centrifuge and control cabinet are still mounted on the shipping skids, they may be transported on the ground using a forklift. After the equipment is removed from the shipping skid, an overhead lifting device is required.

Four reinforced lifting lugs are built into the centrifuge frame to allow attachment of an overhead-lifting device (Figure 3-2). Lifting points are labeled **"LIFT HERE ONLY"**. **DO NOT** attempt lifting equipment by attaching slings or similar lifting aids to the bowl or conveyor drive motor or other non-designated portions of the unit. Four lifting lugs are also provided at the top of the control cabinet for lifting the unit into place (Figure 3-3). Lift points are labeled **"LIFT HERE ONLY"**. **DO NOT** attempt lifting equipment by attaching slings or similar lifting aids to any other location on the cabinet.

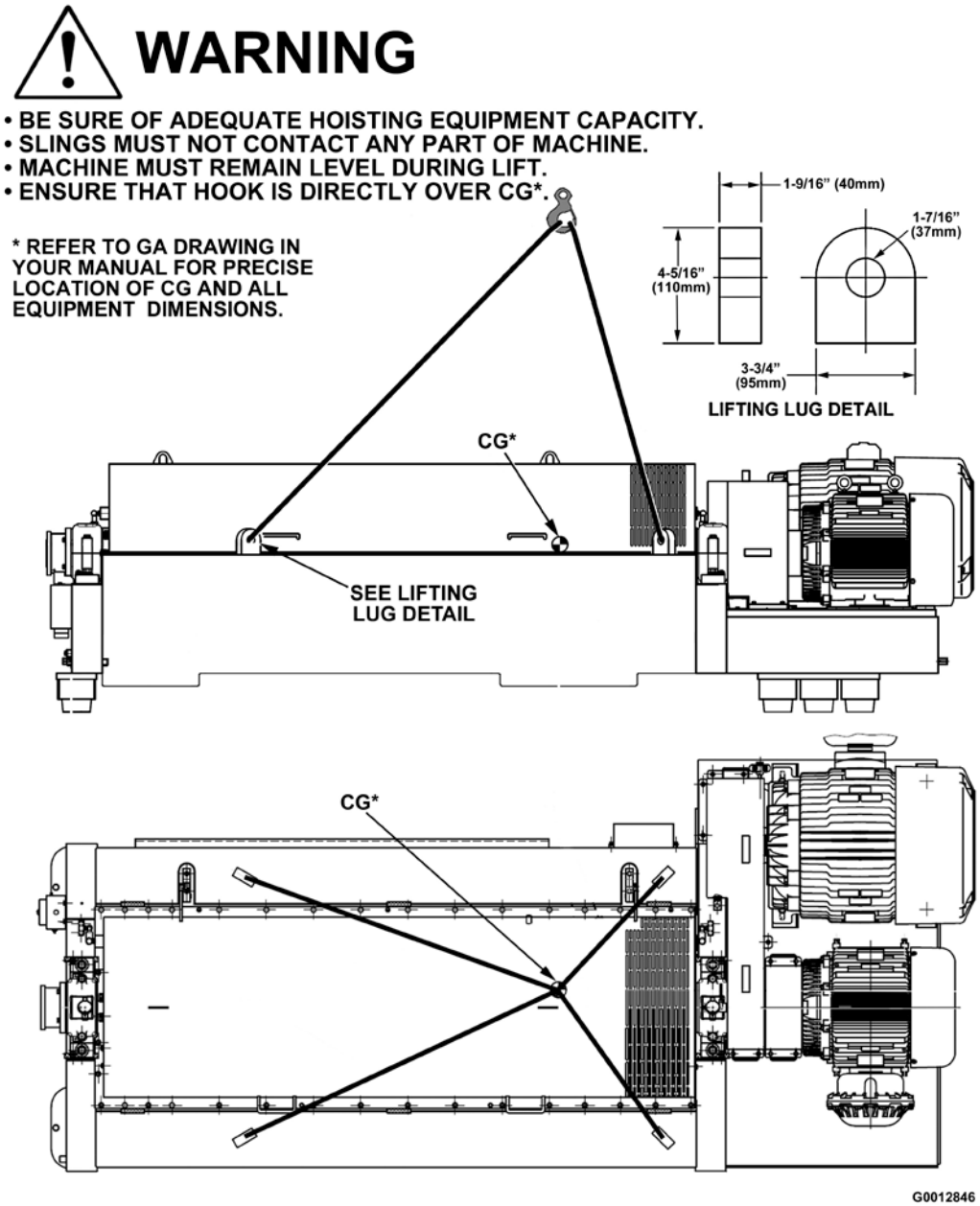


Figure 3-2. Lifting Arrangement - DE-7200 Centrifuge

EQUIPMENT HANDLING (CONT'D)

WARNING

- BE SURE OF ADEQUATE HOISTING EQUIPMENT CAPACITY.
- SLINGS MUST NOT CONTACT ANY PART OF MACHINE.
- MACHINE MUST REMAIN LEVEL DURING LIFT.
- ENSURE THAT HOOK IS DIRECTLY OVER CG*.

* REFER TO GA DRAWING IN YOUR MANUAL FOR PRECISE LOCATION OF CG AND ALL EQUIPMENT DIMENSIONS.

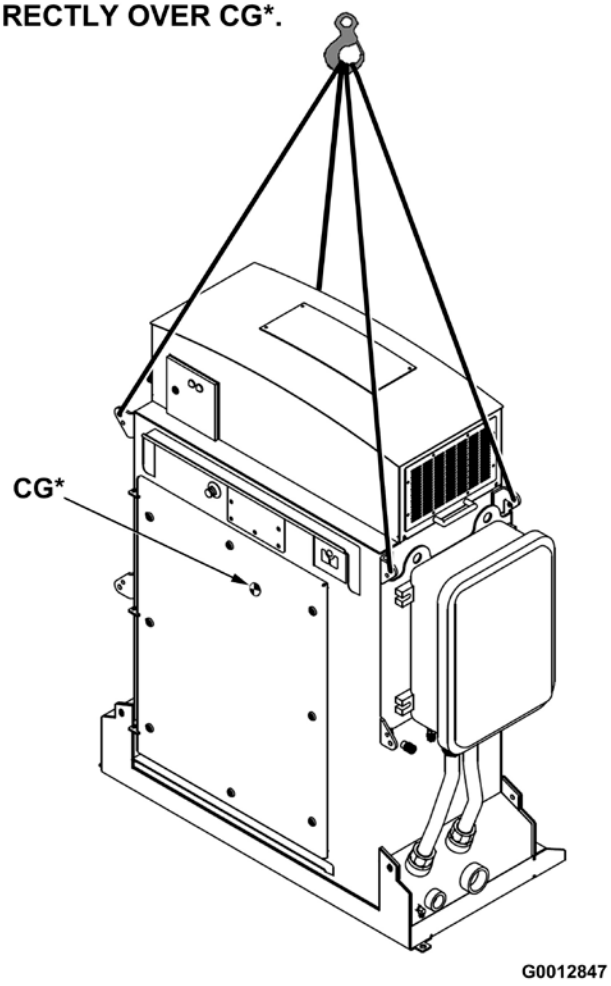


Figure 3-3. DE-7200 Control Cabinet Lifting Arrangement

EQUIPMENT POSITIONING AND MOUNTING

Base plates are required when installing the centrifuge. Lay out the installation site and locate the base plates in accordance with Figure 3-4. The base plates have 1-9/16" x 1-9/16" (40mm x 40mm) centering posts. They may be either bolted or welded to the mounting platform to properly position and prevent movement of the centrifuge. When lowering the centrifuge onto the base plates, ensure that the centering posts engage with the opening at the bottom of each vibration isolator (Figure 3-5).

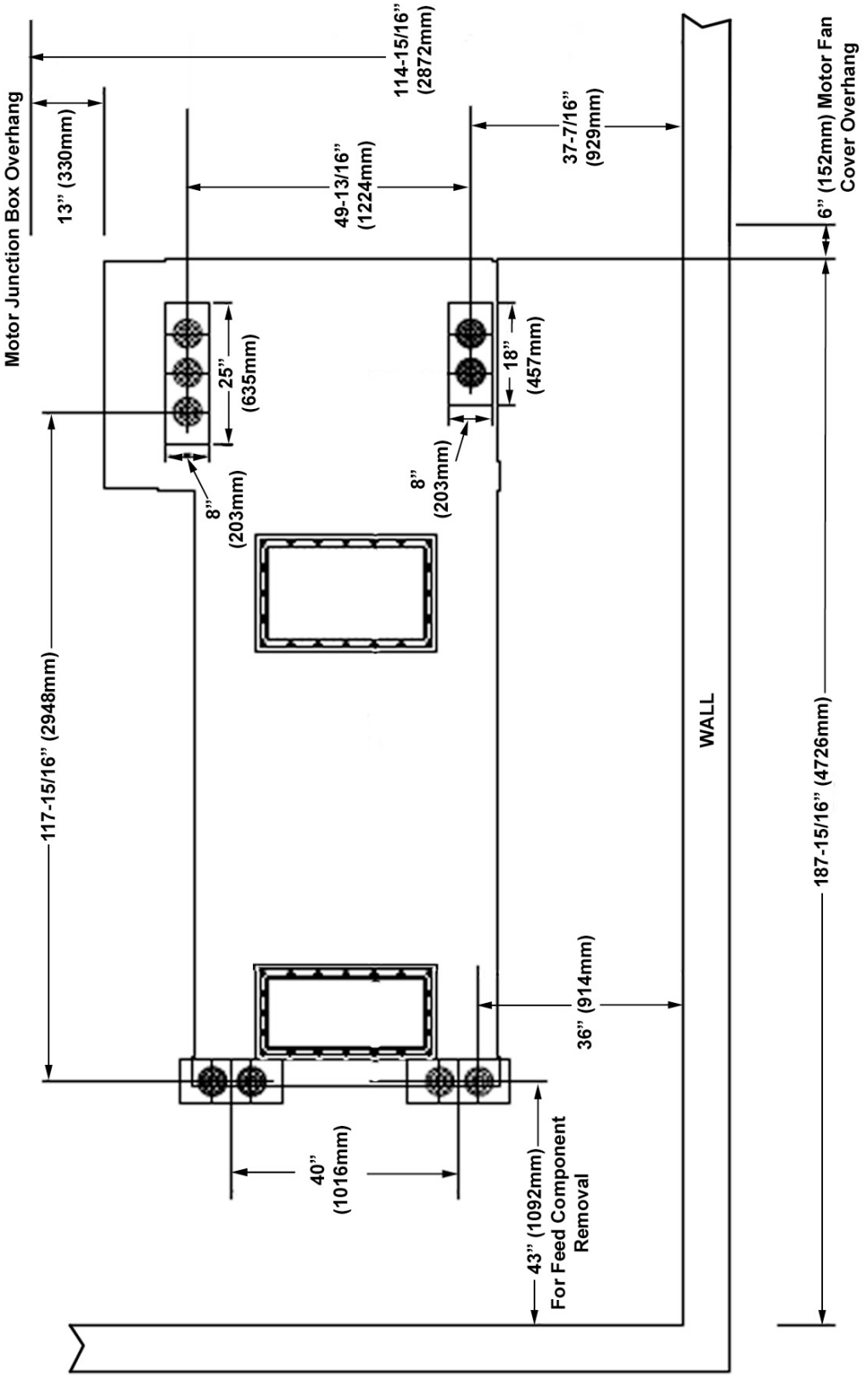


Figure 3-4. Centrifuge Installation Site Layout

EQUIPMENT POSITIONING AND MOUNTING (CONT'D)

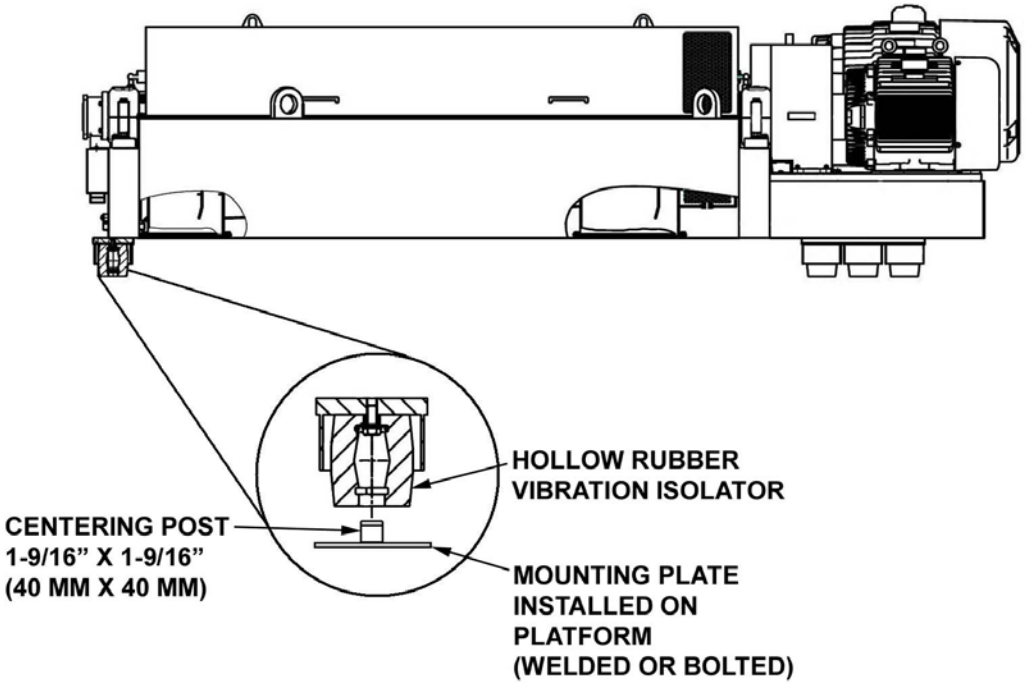


Figure 3-5. Centrifuge Mounting

LIQUID AND SOLID DISCHARGE CHUTES

Observe the design considerations shown in Figure 3-6 when fabricating the liquid and solid discharge chutes. To determine dimensions and mounting hole arrangements, refer to general arrangement drawing in Section 8.

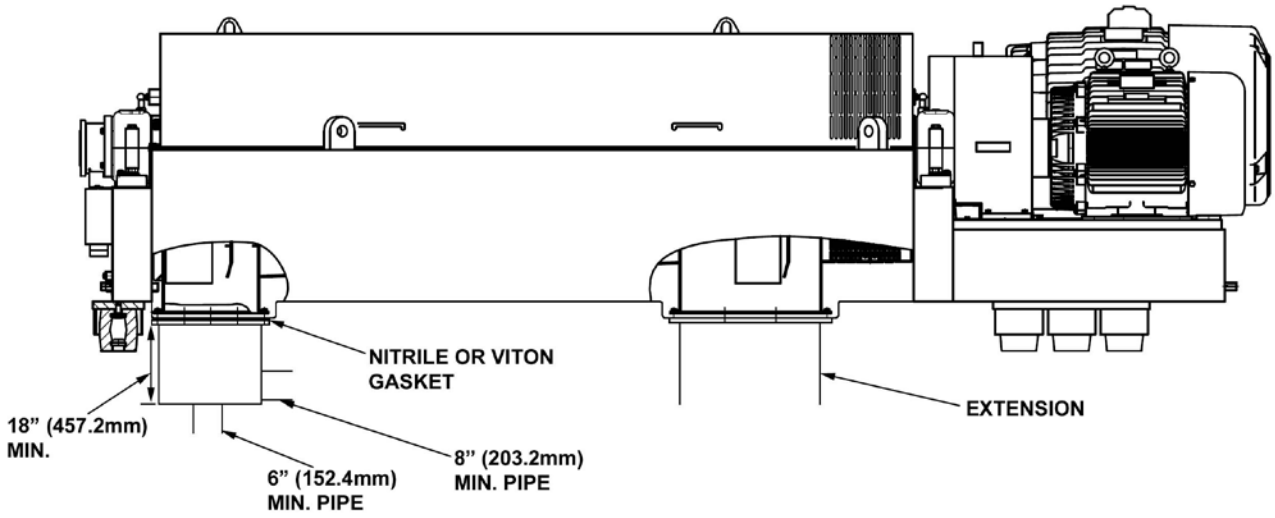


Figure 3-6. Liquid and Solid Discharge Chutes

Liquid Discharge

The liquid discharge collector may be bolted directly to the centrifuge case; however, the piping connection should have a flexible joint. When fabricating the discharge piping, follow the dimensional and piping requirements shown in Figure 3-6. Since liquid exiting the centrifuge is not pressurized, the piping must be pitched to facilitate gravity drainage.

Solid Discharge Chute

A three-sided solid discharge extension may be bolted to the discharge flange. The chute may not be connected to any other component or structure; it must be supported or suspended independently of the centrifuge. The chute should be designed with a sufficiently steep angle to facilitate self cleaning. If this is not possible, a means should be included to continually remove solids from beneath the centrifuge. A curtain or belting should surround three sides of the discharge chute to contain spray and mist.

EQUIPMENT LEVELING

The centrifuge must be properly leveled for satisfactory operation. The equipment must be leveled along the length and width of the unit (Figure 3-7). A 2-foot or torpedo level is recommended. Non-compressible shims should be used as required to level the machine.

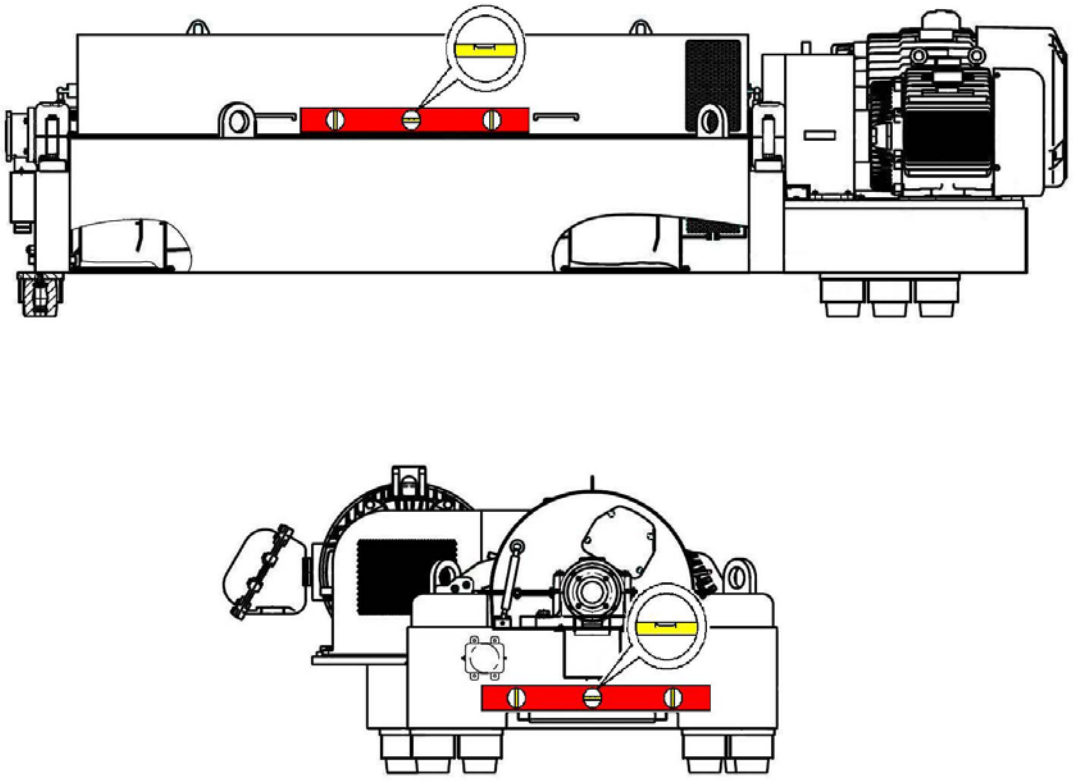


Figure 3-7. Centrifuge Leveling

LOWER AND SECURE ROTATING ASSEMBLY

Note! Do not discard the rubber strips between bearing pillow blocks, cover, and base after removal. These strips must be re-installed whenever the machine is moved to prevent damage to the rotating assembly bearings during transit.

Following final positioning and leveling of the centrifuge, shipping blocks inserted between the bearing pillow blocks and the base, as well as between the case and base, must be removed. The shipping blocks prevent damage to the rotating assembly bearings during transit and should be retained for future installation if the centrifuge is transported.

1. Remove all bolts securing top cover along both sides, but do not remove bolts on both ends of cover.
2. Remove bolts securing bearing pillow blocks to base and bolts securing upper halves of pillow blocks to lower halves (Figure 3-8).

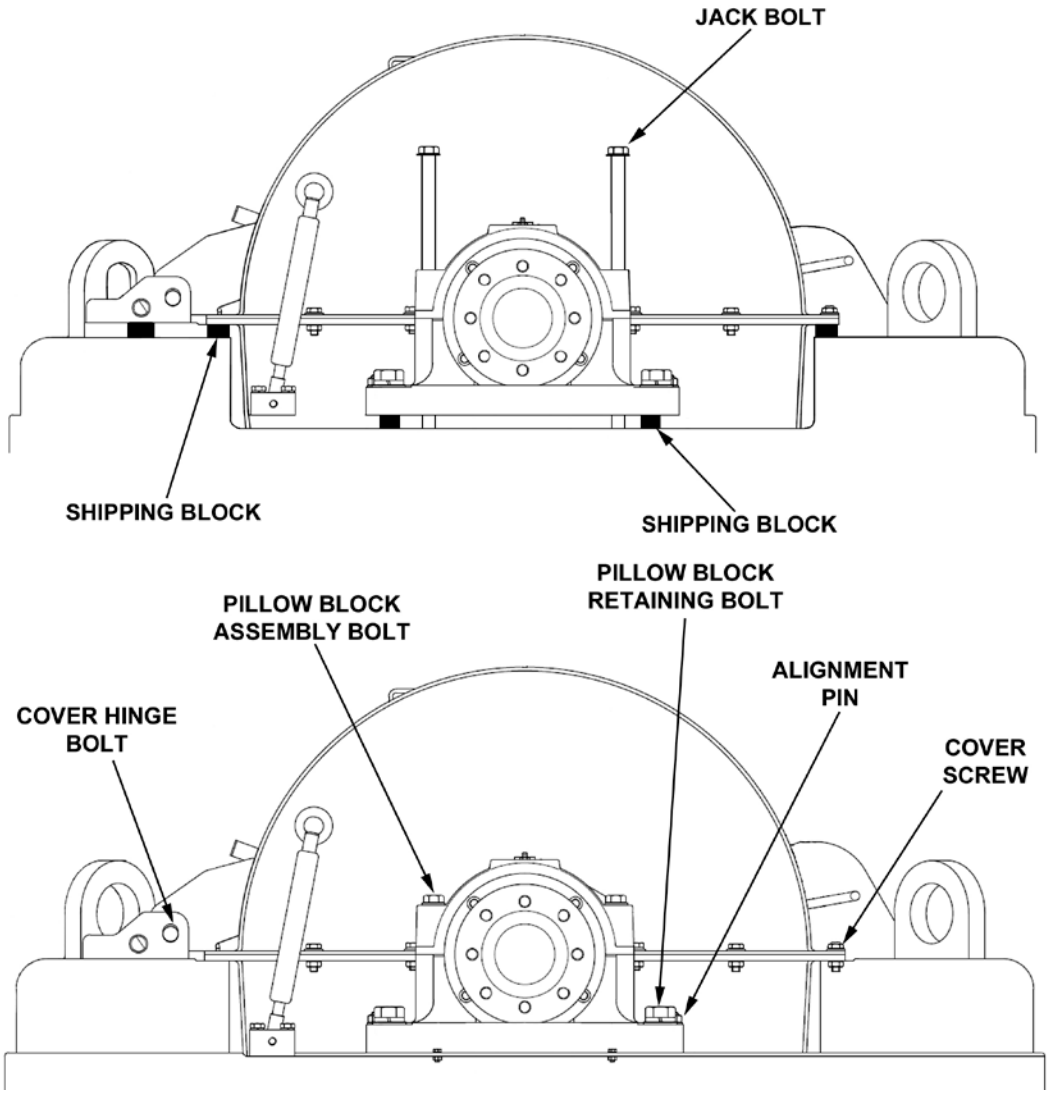


Figure 3-8. Lowering and Securing Rotating Assembly

3. Install two jack bolts in top half of each pillow block, and thread bolts through lower halves.
4. Turn jack bolts clockwise to lift pillow blocks sufficiently to permit removal of all shipping blocks, and remove blocks.
5. Clean mounting surfaces of lower pillow block halves and base, and then apply a light coating of grease or corrosion inhibitor to both surfaces.
6. Ensure that alignment pin holes in base are clean and unobstructed by inserting a tapered reamer that matches the maximum diameter of the holes.
7. Insert four alignment pins into corresponding holes.
8. While turning jack bolts equally in a counterclockwise direction to slowly lower pillow blocks onto base, use alignment pins to properly position pillow blocks before they contact base. Remove jack bolts after pillow blocks are in full contact with base and mounting holes are aligned.
9. Insert two pillow block assembly bolts through top half of each pillow block, and tighten bolts into bottom half of pillow block evenly in accordance with applicable torque specification in Section 5.
10. Use a brass hammer to fully seat alignment pins in bearing pillow blocks and base. Do not tighten nuts on alignment pins.
11. Insert pillow block retaining bolts with washers and lockwashers through pillow block holes, and tighten bolts incrementally to torque specified in Section 5.
12. Install and tighten all bolts along both sides of case cover.
13. Adjust drive belt tension in accordance with Preventive Maintenance in Section 5.
14. Engage coupling half with overload clutch, leaving about a 3/16” (5mm) gap, and tighten bolts.
15. Install and secure guards over belt and shaft.

FEED AND FLUSH CONNECTIONS

Vibration isolation is required to prevent damage to the centrifuge and piping system in case of centrifuge imbalance. Consequently, a flexible connection is required. The feed assembly (Figure 3-9) supplied with the centrifuge has a flex joint to accept the customer’s mating flange and feed and flush piping. The customer must supply a 2.50” raised face 150lb ANSI flange to mate with the feed assembly flange. Refer to general arrangement drawing in Section 8 for liquid and solid discharge chute connection flange dimensions and bolt patterns.

A source of fresh liquid is required for flushing the centrifuge prior to shutdown. To connect the flush line, install a “T” fitting in the feed line with shutoff valves to permit selection of either the feed line or the flush line (Figure 3-10). The shutoff valves are required to prevent flush liquid from flowing back into the customer feed. A cleanout connection is also provided on the top case cover near the solid discharge end (Figure 3-11). Liquid should be fed through this connection with the centrifuge running to periodically remove accumulated solids.

FEED AND FLUSH CONNECTIONS (CONT'D)

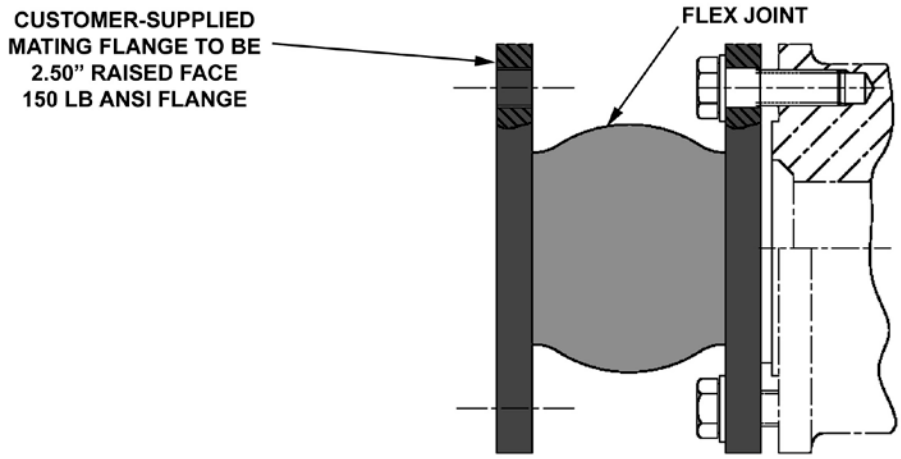


Figure 3-9. Feed Assembly

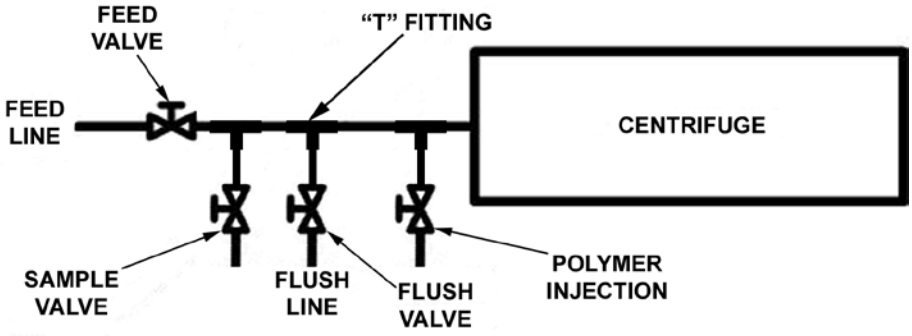


Figure 3-10. Feed Line Connections

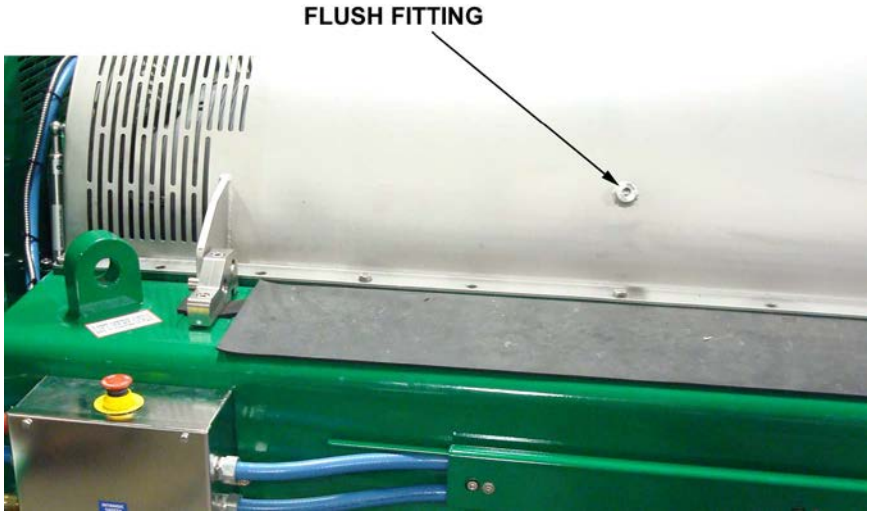


Figure 3-11. Top Cover Flush Fitting

COMPRESSED AIR

Explosion-proof control cabinets require a source of clean, preferably instrument quality, filtered, dry compressed air or nitrogen at 60 to 115 PSI at 20SCFM for operation of the control cabinet purge system. The supply line must have a minimum diameter of 3/4" (20mm). The supply must be clean, non-flammable, and from a non-hazardous area. The cleanliness requirements are as follows:

Solid particles: 0.5μm <particle size ≤1μm, max. 1000 particles/m^3

Humidity: -40°C* pressure dewpoint

Oil content: ≤0.01mg/m^3 concentration total oil

* For applications where ambient temperature, T_{amb} ≤0°C, the air supply should be Class 2.1.1 with humidity -70°C pressure dewpoint

FEED PUMP

The customer is required to supply a positive-displacement feed pump for delivering slurry to the centrifuge. A progressing cavity pump having a fixed ratio gearbox and 30 HP maximum inverter-duty pump drive motor is recommended. The motor must be capable of operating in the 180 to 2700RPM, 6 to 90Hz speed range and also meet all other application requirements including voltage, frequency, and area of classification. The pump size, motor, and gearbox ratio must be chosen to deliver the maximum desired flow at a pump rotor speed (determined by the manufacturer) to be low enough to prevent accelerated wear of the rotor and/or stator.

The pump must be connected to the centrifuge's control system as described under *Electric Power Connections*, so that its operation can be supervised by the centrifuge.

ELECTRIC POWER CONNECTIONS

DANGER! HIGH VOLTAGE! SHUT DOWN, LOCK OUT, AND TAG OUT ELECTRIC POWER, AND ENSURE THAT EQUIPMENT HAS STOPPED ROTATING BEFORE WORKING ON THIS EQUIPMENT. IF THE INPUT POWER IS SPLIT, BE SURE THAT PHASING IS CORRECT BEFORE APPLYING POWER TO CENTRIFUGE.

Connection Options

A fused disconnect primary power supply is required for this equipment. The fused disconnect and interconnecting wiring to the equipment must be suitably sized and in accordance with National Electrical Code (NEC) standards and all other applicable state and local codes.

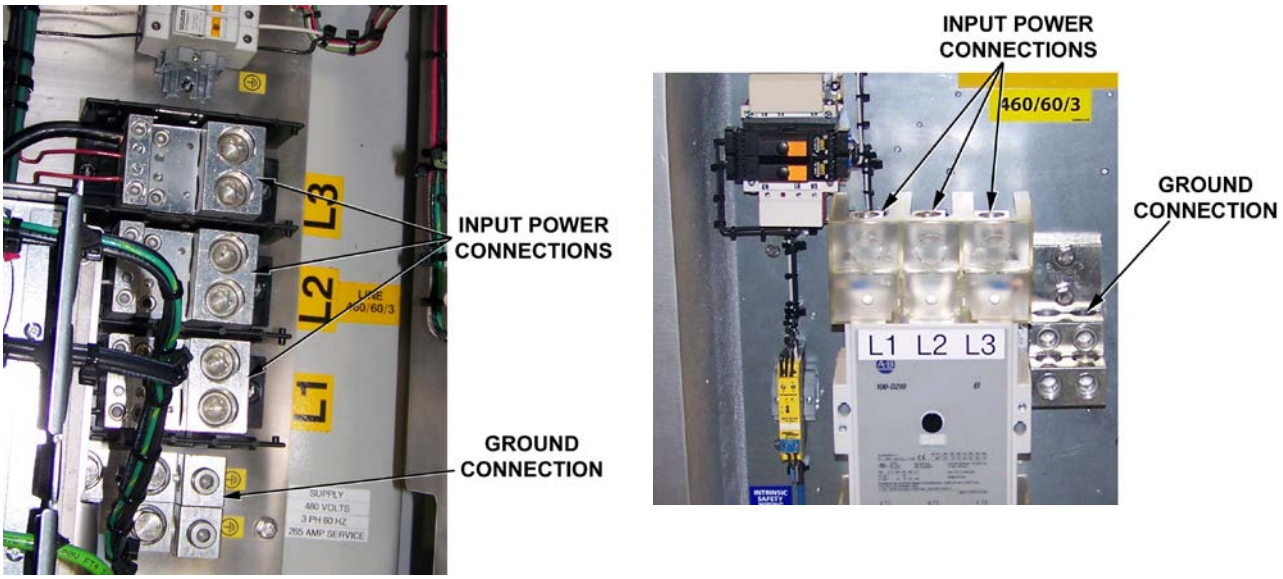
Additional wiring requirements are as follows:

1. The fused disconnect device shall have sufficient interrupting capacity to clear the maximum fault current capability of the power supply system.
2. The GND connections in the control cabinet and sensor system junction box must be connected to a known ground.
3. One of the lugs on the centrifuge base must be connected to earth/electrical ground.

Connect the facility's three-phase electric power supply to the control cabinet in accordance with the appropriate view in Figure 3-12. Non-hazardous area control cabinet connections are made inside the control cabinet; hazardous area connections are made in the electrical panel attached to the right side of the cabinet.

Note that power may be connected with either a single heavy-gage cable or split between two smaller, lighter cables. The smaller-gage cables used for the split-input connections are generally easier to handle. If the input is split (Figure 3-13), be sure to group conductors of the same phase/color.

Cable size depends on machine voltage requirements and cable length. Refer to applicable electrical schematic diagram in Section 8 for cable sizing requirements.



Non-Hazardous Area Control Cabinet **Hazardous Area Control Cabinet**

Figure 3-12. Electric Power Connections

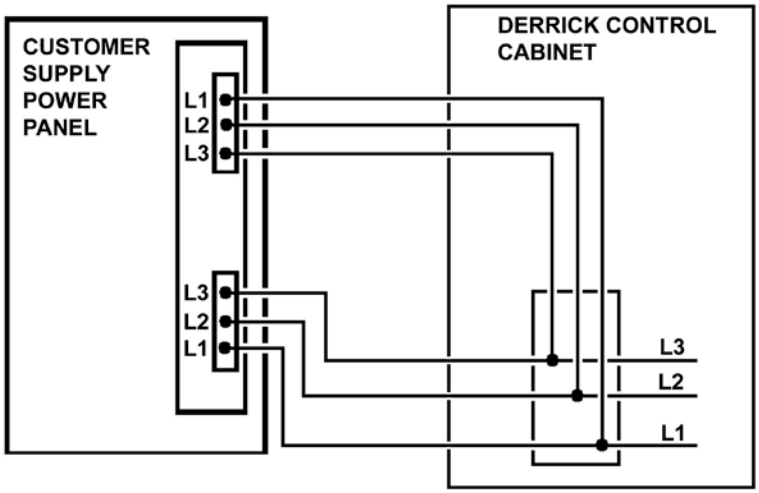


Figure 3-13. Split Input Power Connections

BOWL, CONVEYOR, AND FEED PUMP MOTOR CONNECTIONS

The bowl and conveyor drive motors require three-phase VFD power and ground connections. Power is derived through connections to terminal blocks inside the control cabinet. Similarly, the customer's feed pump motor must be connected to the centrifuge control system for control of its operation.

Connect the bowl, conveyor, and feed pump motors to terminal blocks in the bottom left side of the control cabinet as shown in Figure 3-14. The control system can operate a feed pump drive motor of up to 30HP.

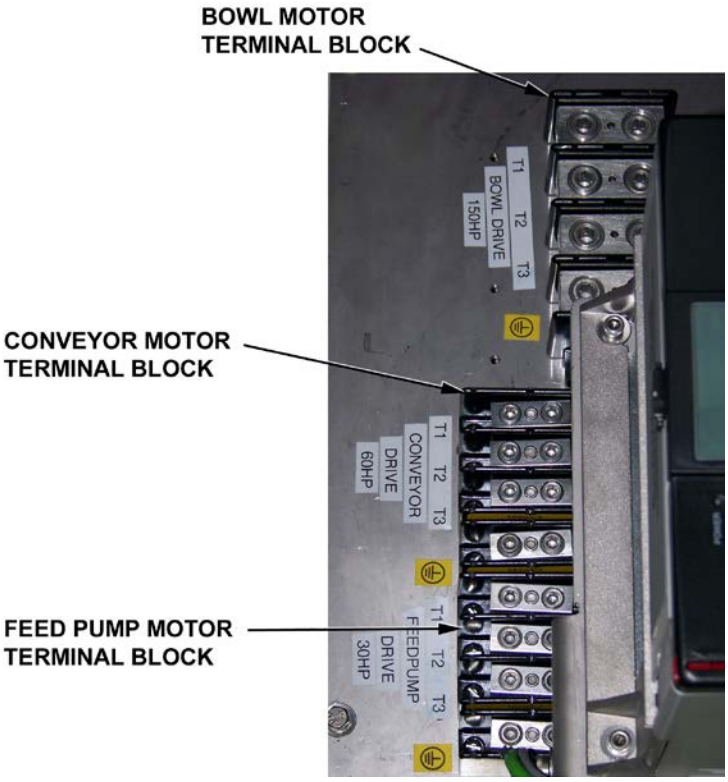


Figure 3-14. Electric Power Connections to Bowl, Conveyor, and Pump Motors

TANK LEVEL SWITCH CONNECTIONS

Tank level switches may be connected to the pump and bowl VFDs to prevent the pump from being started when fluid in the tank falls below a predetermined level. Two normally open float switches can be used to detect high and low tank levels. The switches may be placed at the desired levels to permit the pump to operate under automatic PLC control within the designated window set by the switch positions. The only requirement is to place the high level switch above the low level switch. For hazardous locations, refer to the electrical schematic diagram in Section 8 for intrinsic barrier kit information.

During centrifuge operation, whenever the tank level is above the low switch position, the pump is enabled by the closed low level switch. When the tank level rises sufficiently to close the high level switch, the pump will cycle on and then off once the low level switch opens.

The low level switch is connected to the feed pump VFD through terminal block TB1 (Figure 3-15), which is located to the left of the Ethernet switch. Depending on cabinet wiring, either terminals 1 and 2 or 7 and 8 are used for the connections. The high level switch is connected to the bowl VFD either through terminals 3 and 4 or 9 and 10.

TANK LEVEL SWITCH CONNECTIONS (CONT'D)

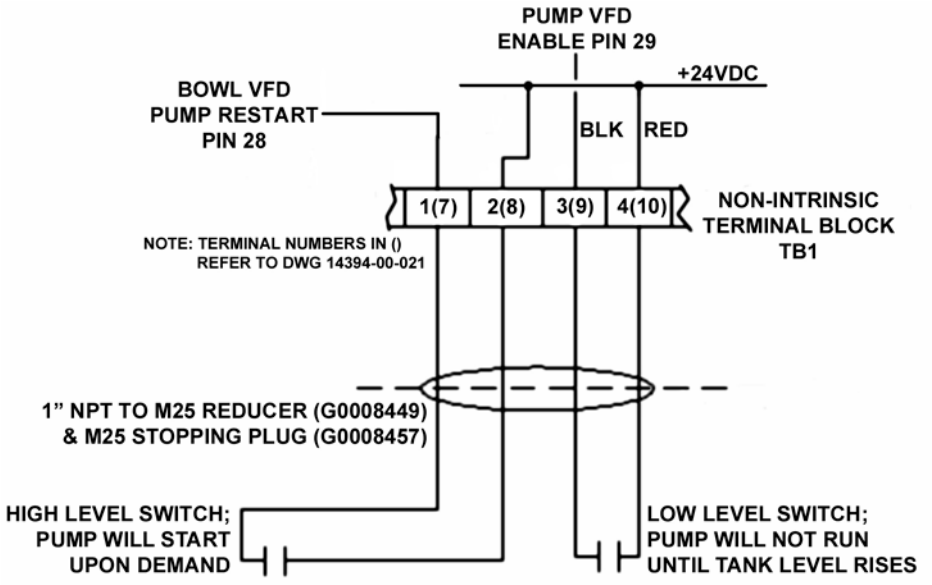


Figure 3-15. Typical Tank Level Switch Connections

POLARITY TEST

WARNING! BE CERTAIN THAT MOTORS ROTATE IN CORRECT DIRECTION. INCORRECT POLARITY OF CONVEYOR MOTOR WILL CAUSE CONVEYOR TO ROTATE AT AN INCORRECT SPEED, WHICH WILL RESULT IN PROCESSING PROBLEMS.

In the following procedure, polarity is critical. Be certain that all motors rotate in the correct directions. Simply checking to see if solids are discharged out the solid end **DOES NOT** ensure correct polarity!

If conveyor motor is wired incorrectly, the conveyor may become plugged or flooded depending on the speed settings of the bowl and conveyor. Test for correct polarity of all connections as follows:

1. Apply power to centrifuge.
2. Run bowl at 20RPM with a conveyor differential speed of 5RPM.
3. Confirm direction of rotation for bowl, conveyor, feed pump, and air conditioner condenser motors as follows:
   a. Bowl - Counterclockwise viewed from fan end
   b. Conveyor - Clockwise viewed from fan end
   c. Feed pump - Per manufacturer's data
   d. Air conditioner condenser fan motor - Clockwise viewed from fan end of motor
4. Correct reverse rotation by shutting down power and switching any two of the three power leads at the terminal block(s) inside the cabinet (refer to electrical schematic diagram in Section 8).

WARNING! CENTRIFUGE MUST BE OPERATED AT THE DESIGNATED SUPPLY VOLTAGE.

DANGER! DANGER! HIGH VOLTAGE! SHUT DOWN, LOCK OUT, AND TAG OUT ELECTRIC POWER, AND ENSURE THAT EQUIPMENT HAS STOPPED ROTATING BEFORE WORKING ON THIS EQUIPMENT. IF THE INPUT POWER IS SPLIT, BE SURE THAT PHASING IS CORRECT BEFORE APPLYING POWER TO CENTRIFUGE.

WARNING! ELECTRICAL CONNECTIONS MUST BE MADE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES. FAILURE TO COMPLY MAY RESULT IN AN UNSAFE CONDITION THAT COULD INJURE PERSONNEL OR DAMAGE EQUIPMENT. ENSURE THAT ALL ELECTRICAL AND CONDUIT CONNECTIONS ARE SECURE.

SENSOR CONNECTIONS

A cable is supplied for sensor connections. One end of the cable is pre-wired to the plug supplied with the centrifuge, and the opposite end must be connected to terminals inside the sensor junction box as shown in Figure 3-16. After completing the wiring, plug the cable into the receptacle on the upper left side of the control cabinet.

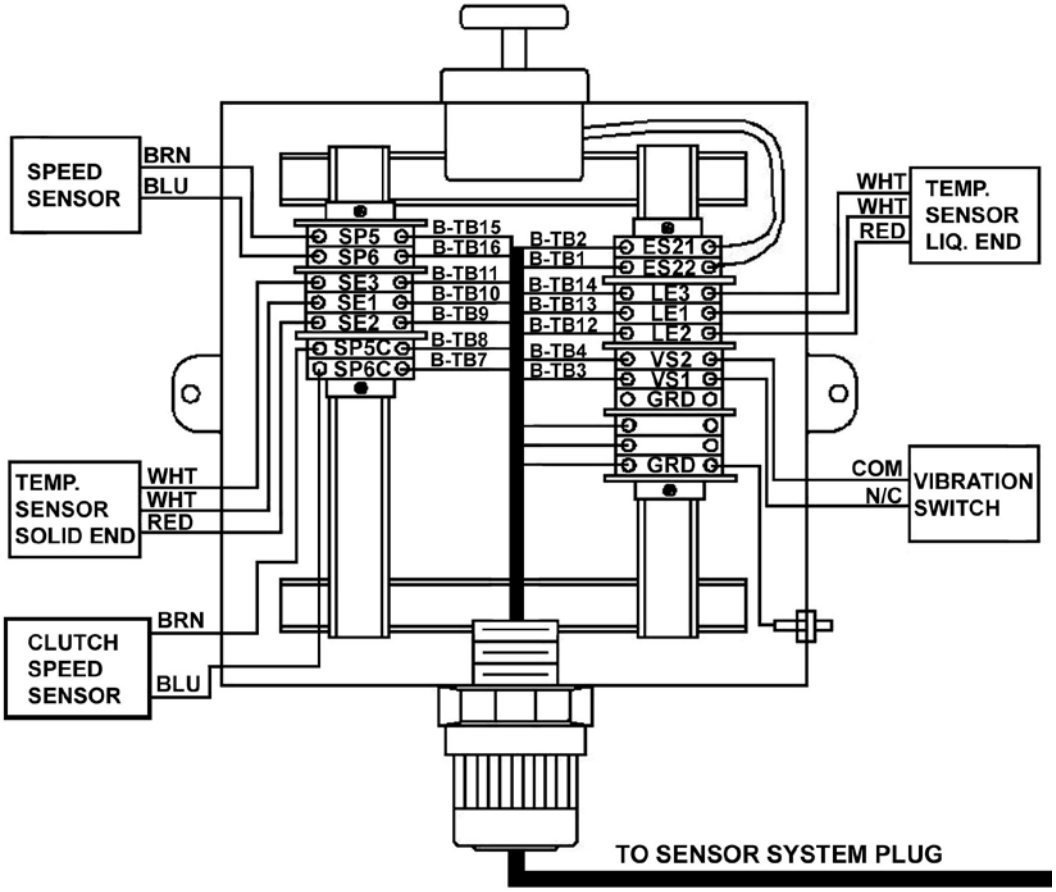


Figure 3-16. Sensor System Junction Box Connections

MACHINE STARTUP

Refer to Section 4 for initial startup and operating procedures for the centrifuge.

WARNING! DO NOT ATTEMPT TO OPERATE MACHINE WITH SHIPPING BRACKETS INSTALLED.

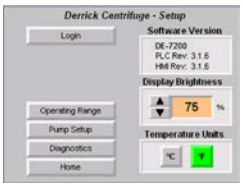
SECTION 4 - OPERATING INSTRUCTIONS

GENERAL

The procedures in this section are for use only by trained personnel who are qualified to operate high-speed rotating equipment. Initial and normal startup, operation, shutdown, and emergency shutdown procedures are included. Following the startup and operation procedures, detailed information on the control screens is provided to assist the operator and technician in understanding centrifuge operation and fully utilizing its capabilities. The centrifuge is designed to be operated only for the purpose specified at the time of purchase. Operation in any other application requires consultation with Derrick engineering.

SOFTWARE VERSION

The operating procedures in this section apply to DE-7200 VFD centrifuges having software Version 3.1.6 installed. The software version is shown on the Setup screen shown below:



Although operating procedures are generally identical, an earlier software version may cause some screens to appear slightly different from those shown on the following pages.

OPERATING SAFETY

⚠	**WARNING! ALL OPERATING AND MAINTENANCE PERSONNEL MUST READ AND UNDERSTAND ALL SAFETY INFORMATION IN THIS MANUAL BEFORE WORKING WITH THE EQUIPMENT.**
⚠	**WARNING! BE SURE THAT COVER IS CLOSED AND SECURED AND ALL PERSONNEL ARE CLEAR BEFORE STARTING MACHINE.**
⚠	**WARNING! BE SURE THAT ALL SHIPPING COMPONENTS HAVE BEEN REMOVED AND BEARING PILLOW BLOCKS ARE PROPERLY TIGHTENED.**
⚠	**WARNING! ALWAYS ALLOW MACHINE TO COAST TO A COMPLETE STOP BEFORE OPENING COVER OR REMOVING GUARDS.**
⚠	**WARNING! DO NOT OPERATE CENTRIFUGE IF EXCESSIVE NOISE OR VIBRATION DEVELOPS. ALWAYS CONFIRM THAT VIBRATION SWITCH AND OTHER SAFETY DEVICES ARE FUNCTIONAL.**
⚠	**WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.**

TOP COVER OPENING/CLOSING PROCEDURES

The proper procedures for opening and closing the top cover of the centrifuge must always be followed. Two operators using both hands are required to open the cover. Derrick recommends having a hoist available if additional assistance is desired during the opening/closing of the centrifuge cover. To open and close the cover, proceed as follows:

1. Shut down, lock out, tag out electric power to centrifuge, and allow rotating assembly to coast to a full stop.
2. Remove bolts securing cover to base.
3. Have two operators using both hands grip the cover handles securely to ensure full control of the cover throughout the opening and closing process.
4. As the cover is raised, ensure that body limbs of all personnel and any other items remain clear of the cover gap at all times.
5. Raise the cover to the fully opened position, and insert a 1/2” (12.7mm) hardened steel pin through one hinge to lock the cover open.
6. After performing the activity that required the cover to be opened, reverse steps 2 through 5 to close the cover. During the closing procedure, ensure that both operators are capable of controlling the cover’s descent and that all body limbs and other items remain clear of the gap.

PURGE SYSTEM (HAZARDOUS ENVIRONMENT ONLY)

During startup, the control cabinet purge system drives out all gases from the cabinet interior and then maintains positive pressure within the control cabinet to prevent entry of any potentially explosive gases. Purge system operation begins when the system senses sufficient air pressure inside the cabinet. Initially, the purge unit performs a 16-minute rapid purge cycle at 16 CFM. During the rapid purge cycle, the purge system prevents application of electric power to the cabinet. At the end of the rapid purge cycle, the purge system closes the main electrical contactor, allowing electric power to flow to the cabinet. The centrifuge may then be started.

After the rapid purge cycle, the purge system maintains positive pressure within the cabinet to prevent entry of hazardous gases, automatically compensating for pressure loss due to cabinet leakage. If at any time a loss of cabinet pressure is detected, the main contactor opens immediately, disconnecting power. If a shutdown occurs during centrifuge operation, the purge system performs another 16-minute rapid purge before power is restored to the cabinet.

Purge System Bypass

DANGER! EXPLOSION HAZARD! BE CERTAIN THAT SURROUNDING ATMOSPHERE IS CLEAR OF ALL POTENTIALLY EXPLOSIVE GASES BEFORE OPENING CONTROL CABINET DOOR.

If the control cabinet is located in a non-hazardous environment, the purge system may be turned off. **A high risk of fire and/or explosion will result if purge system is bypassed in a hazardous area.** Also, with the purge system bypassed, the centrifuge will remain energized if the control cabinet door is opened. **Consequently, use extreme caution when operating the equipment or performing any procedure with purge system bypassed**. If the control cabinet is moved to a hazardous environment, the bypass must be removed and satisfactory purge system operation confirmed.

DANGER! USE EXTREME CAUTION WHEN OPERATING CENTRIFUGE WITH PURGE SYSTEM BYPASSED. DANGEROUSLY HIGH VOLTAGE WILL BE PRESENT IN CONTROL CABINET IF DOOR IS OPENED WHILE POWER IS APPLIED.

To bypass the purge system, proceed as follows:

1. Be certain that control cabinet is in a non-hazardous environment; then shut down, lock out, and tag out electric power to centrifuge.
2. Remove bolts securing electrical panel door at right side of cabinet, and open door.
3. Locate intrinsic barrier at upper right side of electrical panel, and install a jumper across terminals 1 and 4 to disable the purge system (Figure 4-1).
4. Label jumper **"Purge Bypass"**.
5. To restore purge system operation, remove the **"Purge Bypass"** jumper, and close and secure electrical panel door. Confirm proper operation of the purge system.

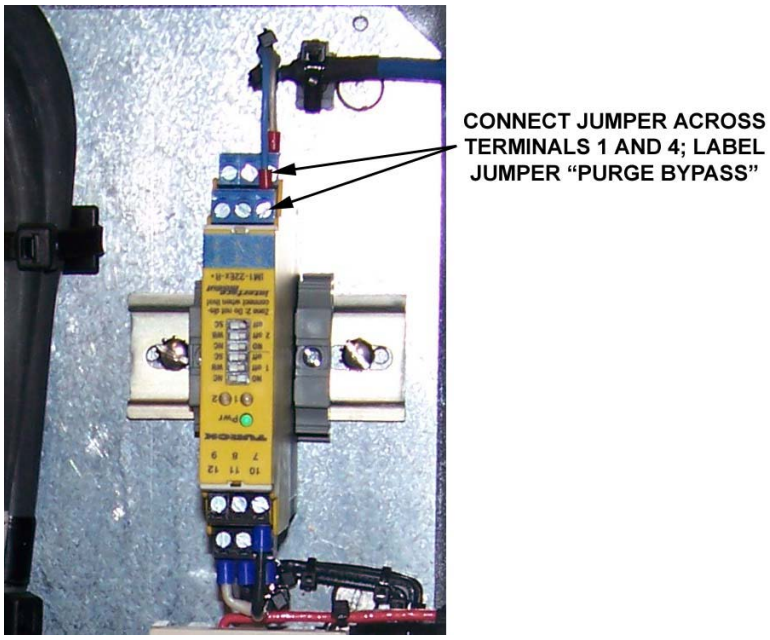


Figure 4-1. Purge System Bypass

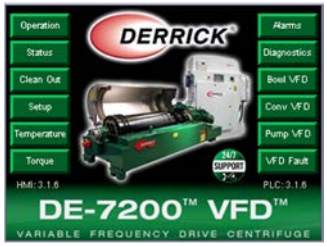
INITIAL STARTUP

Perform the initial startup procedure when the centrifuge is being started for the first time following installation or after the machine has been relocated.

1. Check that all tools, documents, and shipping brackets have been removed, and there are no obstructions to operation.
2. Verify that all personnel are clear of equipment.
3. Confirm that all operators and maintenance personnel have read and understand all operating and safety information in Section 2.
4. Verify that equipment has been installed properly, all shipping brackets have been removed, and bearing pillow blocks have been tightened to specified torque per Section 3.
5. For explosion-proof cabinet, turn on compressed air to purge system.

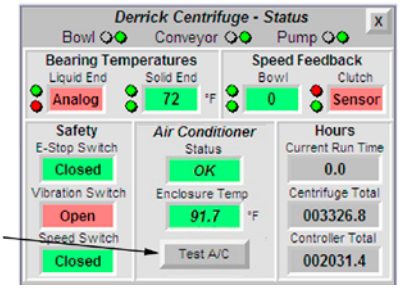
INITIAL STARTUP (CONT'D)

6. Apply electric power to centrifuge. The following screen will appear (on explosion-proof cabinet, displayed after purge cycle is completed):

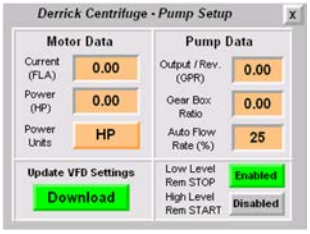


7. Without the centrifuge running, perform the following safety checks to confirm that connections are correct between control cabinet and centrifuge:
   - Operate emergency stop buttons on junction box and control cabinet, and check for Emergency Stop alarm message on control panel.
   - Pull out emergency stop buttons to clear alarm message.
   - Tap vibration switch housing horizontally with a rubber or rawhide mallet, and check for High Vibration Fault message on control panel.
   - Press reset button on vibration switch to clear alarm message.
8. Select *Cent. Status* to display the *Status* screen below. Select *Test A/C*, and check that air conditioner fan rotates in the direction indicated by the label. If not, reverse any two fan motor leads.

CYCLE AIR CONDITIONER ON FOR 30 SECONDS TO CHECK MOTOR ROTATION DIRECTION; CHANGES TO GREEN "AC Running" WHEN COMPRESSOR CYCLES ON



9. Verify that machine is ready for operation. Correct any deficiencies before proceeding with startup procedure. If condition is satisfactory, click in the upper right corner to return to the *Home* screen.
10. Select *Setup* and then click on *Pump Setup* to view pump operating information:



11. Configure pump parameters as follows:
    a. Input data from the pump and pump motor nameplates.

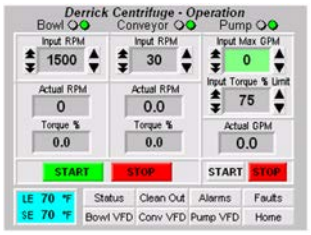
Note! Correct pump data is critical to achieving the desired feed rate to the centrifuge.

b. Select *Download* to update VFD settings with new motor data. This will cause pump to autotune at the next startup.

c. Select *Disable* for Tank High and Low Level inputs, if they will not be used.

d. When finished making required changes, click “X” in upper right corner to return to Setup screen. Select *Home* to return to Home screen.

12. Select *Operation* to display the following screen:

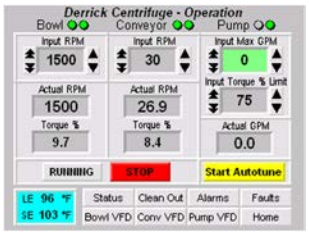


13. Using up and down arrow buttons, initially set Bowl Input RPM at 20 RPM, and set Conveyor Input RPM at 5 RPM.

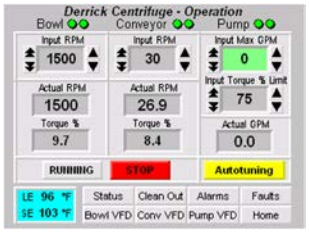
14. Select *START* to confirm that bowl and conveyor motors rotate in the direction indicated by labels.

15. Correct reverse rotation by shutting down power and switching any two of the three **motor** leads (not incoming power leads) at the terminal block(s) inside the cabinet (refer to Section 3 and electrical schematic diagram in Section 8).

16. After confirming correct motor rotational directions, enter desired Bowl Speed of at least 750RPM, and enter desired Differential Speed; select *START* to begin centrifuge operation. Screen will display actual Bowl Speed, Differential Speed, and Torque %. When bowl speed reaches 750RPM, PUMP START/STOP at right side of screen will change to *Autotune.*



17. Select *Start Autotune* to tune pump drive motor to VFD. While autotuning is underway, the following screen will appear:



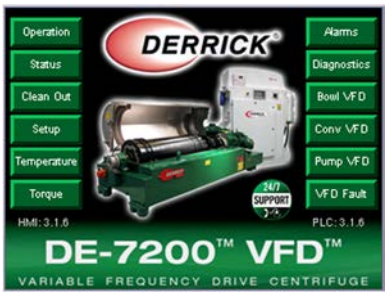
18. Allow about 60 seconds for autotuning.

19. Enter a GPM, and select *START* to turn on pump. Check that pump is rotating in the direction indicated on rotation label. If not switch any two of the three pump leads.

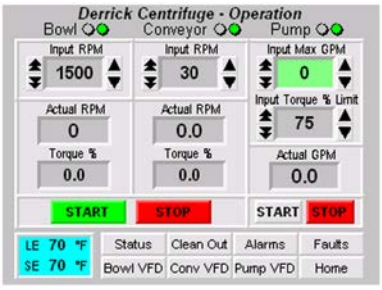
NORMAL STARTUP

Note! If Centrifuge is Heated, Before Starting Centrifuge Follow COLD CLIMATE STARTUP Instructions Later in This Section to Ensure Proper Bearing Lubrication.

1. Without electric power applied, open cover and rotate bowl assembly manually to check that the bowl turns freely and no rubbing is felt.
2. Close cover, tighten all cover bolts to required torque (refer to Section 5), and ensure that all guards are in place.
3. Verify that all personnel are clear of centrifuge and all guards are in place before applying electric power to equipment.
4. For explosion-proof cabinet only, turn on compressed air to begin the cabinet purge cycle.
5. Apply electric power to centrifuge. The following screen will appear (on explosion-proof cabinet, displayed after purge cycle is completed):



6. With Home screen displayed, select *Operation* to display the following screen:



7. Using up and down arrows, set Bowl and Conveyor Input RPMs at desired speeds: Bowl - 750RPM minimum; Conveyor - 1RPM minimum.
8. Two options are available for controlling the feed pump. If automatic control by the PLC is desired, enter *Torque %*. The pump GPM will then be varied automatically based on bowl and conveyor torque percentages. Enter *Flow GPM* for operator setting of pump GPM. Note that even with *Flow* selected, the PLC will vary the pump GPM or even shut down pump if excessive torque is sensed. The *Max GPM* field always dictates the highest possible flow rate, even when centrifuge is operating in Torque mode.
9. Select *START* to turn on centrifuge. Note that Bowl and Conveyor speeds will gradually rise until settings are reached, and Torque % for bowl and conveyor will rise. If pump drive motor data has been changed since previous startup, select *Autotune* to tune motor to VFD.
10. When bowl speed has reached speed setting, select *Pump START* to start feed pump, and slowly introduce feed to centrifuge.

Note! Pump will not start until actual bowl speed is within 120RPM of setting.

11. Adjust feed rate, Bowl speed, and/or Conveyor speed as required to optimize centrifuge operation. Select *Data* screens at any time to review and monitor centrifuge operating characteristics, including air conditioner status, elapsed operating time, and VFD data.

Note! Depending on conveyor differential speed setting, at bowl speeds above 300RPM conveyor motor may rotate in opposite direction.

COLD CLIMATE STARTUP

In below-freezing ambient conditions where steam, portable heaters, or other means is used to raise the temperature of the centrifuge, re-lubrication of bearings may be necessary prior to startup. If bearing housings reach a temperature of 200°F (93°C), grease may liquefy and drain from bearings. This will result in dry running the bearings upon startup. To prevent this condition, proceed as follows:

1. After applying heat and prior to startup, pump 15 shots of grease into each main bearing.
2. Refill conveyor bearings until grease is observed exiting the appropriate drain hole.
3. After machine is started, pump an additional five shots of grease into each main bearing.
4. Monitor bearing temperatures for the first 2 hours of centrifuge operation.

Note! It is Normal for Temperatures to Rise for 15 to 30 Minutes After Greasing and Then Return to Normal.

OPERATION

The properties of the inlet slurry and desired separation should be known in advance. This information can be used to set and change bowl speed, conveyor differential speed, and feed rate (unless set for automatic control) as required during centrifuge operation. The centrifuge control panel indications, as well as the condition of the inlet slurry, must be monitored to ensure that desired effluent clarity and solids dryness are achieved. Rising conveyor torque indicates that one or more operating parameters should be lowered to reduce torque. Conversely, falling conveyor torque shows that speed can be raised and/or feed rate increased. Operating parameters should be adjusted, as required, to optimize centrifuge operation and prevent automatic shutdown due to excessive bowl or conveyor torque.

The *Operation* screen (Figure 4-2) permits the operator to view current operating information for the bowl, conveyor, and pump and adjust the parameters as required to meet changing conditions.

Through this screen, the operator may view and set bowl and conveyor RPMs and torque percentages, set feed pump flow rate, and view bearing temperatures. Adjustments of the conveyor and bowl speeds may be performed using up and down arrows or by entering actual numbers on the popup numeric keypad. In addition, options are provided for stopping the centrifuge, displaying VFD operation screens, and selecting Status, Clean Out, Faults, Alarms, and Home screens. The following parameters affect centrifuge operation: Feed rate, pond depth, bowl speed, and conveyor speed.

OPERATION (CONT'D)

Adjustment of one parameter may produce the desired clarity of liquid effluent and solids dryness. Or the desired performance may be achieved by further adjustment. It is important to understand the interdependence of the operating parameters. Changing one characteristic results in other effects that may warrant additional adjustments.

Except for pond depth, these parameters can be adjusted while the centrifuge is operating. The operator may then view the results of one change before making additional adjustments. The following paragraphs describe the effect of changing each parameter.

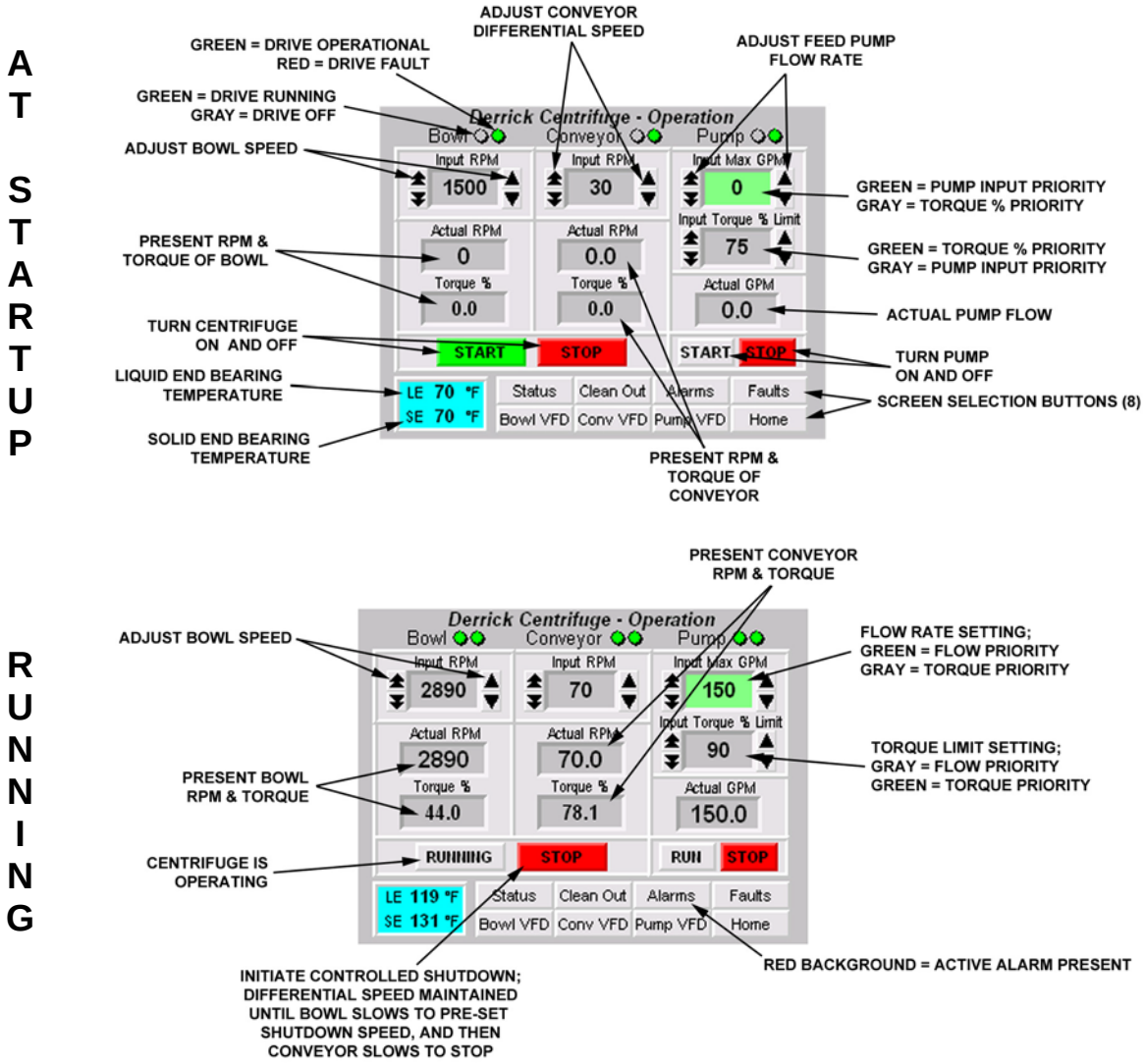


Figure 4-2. Operation Screens

Feed Rate and Torque Settings

The maximum feed rate and torque limit are entered at the upper right of the *Operation* screen as shown in Figure 4-2. The desired mode is selected by clicking on the number shown in the cell. The keypad appears, allowing the operator to enter the desired flow rate or torque percentage. The background in the selected cell turns green to signal the governing mode. If flow priority mode is selected, the system automatically increases feed rate up to the maximum setting as long

as the torque remains below the set limit. If the slurry is low in viscosity and density, operation will continue in the flow priority mode. However, conveyor torque may rise if solids volume increases, as the conveyor may become burdened in moving the increased solids volume at the present feed rate and bowl speed. When the torque reaches the torque limit setting, the system automatically switches to torque priority mode, and the background of the Input Torque % Limit cell becomes green. The feed rate is then reduced to permit the torque to fall. The system will remain in the torque priority mode once entered. To switch back to flow priority mode, the operator must click on the flow rate number, and enter a lower flow rate that will not cause an over-torque condition to re-occur. For more information on the flow priority and torque priority modes, refer to Section 1.

Bowl Speed

The faster the bowl speed, the faster solids are settled through the pond to the outer wall of the bowl. A faster bowl speed for a given feed rate results in dryer solids discharge. To reduce wetness, the slurry must remain in the bowl longer, subjecting it to the settling process for a longer duration before being conveyed out the solids discharge. Conversely, reducing bowl speed may be desirable for thick, heavy slurry to extract only high-density materials or larger particles.

Both the bowl speed setting and actual bowl speed are shown on the control panel. The torque percentage of the bowl is also displayed. This information is useful in optimizing bowl speed to produce the desired solids dryness and processing speed.

Conveyor Differential Speed

With correct wiring polarity, the conveyor responds properly to settings made on the Operation screen. Changing the conveyor differential speed adjusts the solids discharge rate. Generally, a slower differential speed will produce drier solids but reduces the solids discharge rate. Increasing conveyor speed reduces drying time, leading to wetter discharged solids. Reducing conveyor speed results in drier solids discharge. However, excessively slow conveyor speed permits solids to accumulate in the bowl, possibly causing an overload condition. The drying time is reduced by increasing the conveyor differential speed, which will increase the wetness of the solids. Reducing the conveyor differential speed raises the settling time, which will produce drier solids.

Both the conveyor speed setting and actual conveyor speed are shown on the control panel. In addition, the conveyor torque percentage is shown to assist in optimizing conveyor speed to produce the desired solids dryness and processing speed.

Since the conveyor differential speed is controlled by the PLC relative to the bowl speed setting, wiring polarity of electrical components is critical. Depending on settings, electrical polarity determines actual speed and direction of conveyor motor for any bowl speed setting. For example, with a bowl speed setting of 2000RPM and conveyor differential speed set at 60, the conveyor motor will rotate in reverse at -1120RPM.

The correct bowl-to-conveyor speed relationship depends on correct wiring polarity. If polarity is reversed, the same bowl speed setting of 2000RPM described above would result in an actual conveyor differential speed of about 17 rather than the setting of 60.

Pond Depth

Pond depth can only be adjusted with the centrifuge fully stopped and disabled. For this reason, pond depth is usually adjusted last. The factory pond depth setting is usually satisfactory when used in conjunction with feed rate, bowl speed, and conveyor speed adjustments. However, if desired results cannot be achieved by other means, the pond depth may require re-setting.

Pond Depth (Cont'd)

Six adjustable weir plates are provided on the liquid bowl head to facilitate setting the pond depth; all ports must be set identically. A deeper pond depth (move weir plates toward 380mm) increases settling time by permitting more liquid to remain in the bowl. However, a deeper pond depth also reduces the beach area at the solids discharge end of the bowl, which will result in a wetter solids discharge.

The weir plates may be adjusted to provide a liquid depth ranging from 380mm to 460mm (Figure 4-3). This numerical range represents the inside diameter of the fluid ring. As shown, the beach length will vary from 36.2mm to 234.7mm, depending on weir opening. Raising the liquid depth reduces the beach length, and lowering the depth lengthens the beach. For example, to obtain the lowest liquid level the weir plates are set at the bottom notch on the weir gage plate. At this setting, the resulting liquid level is 380mm, and the corresponding beach length is 206.4mm. By moving the weir plates upward to the top notch, however, the liquid level rises to 460mm and liquid fully covers the beach.

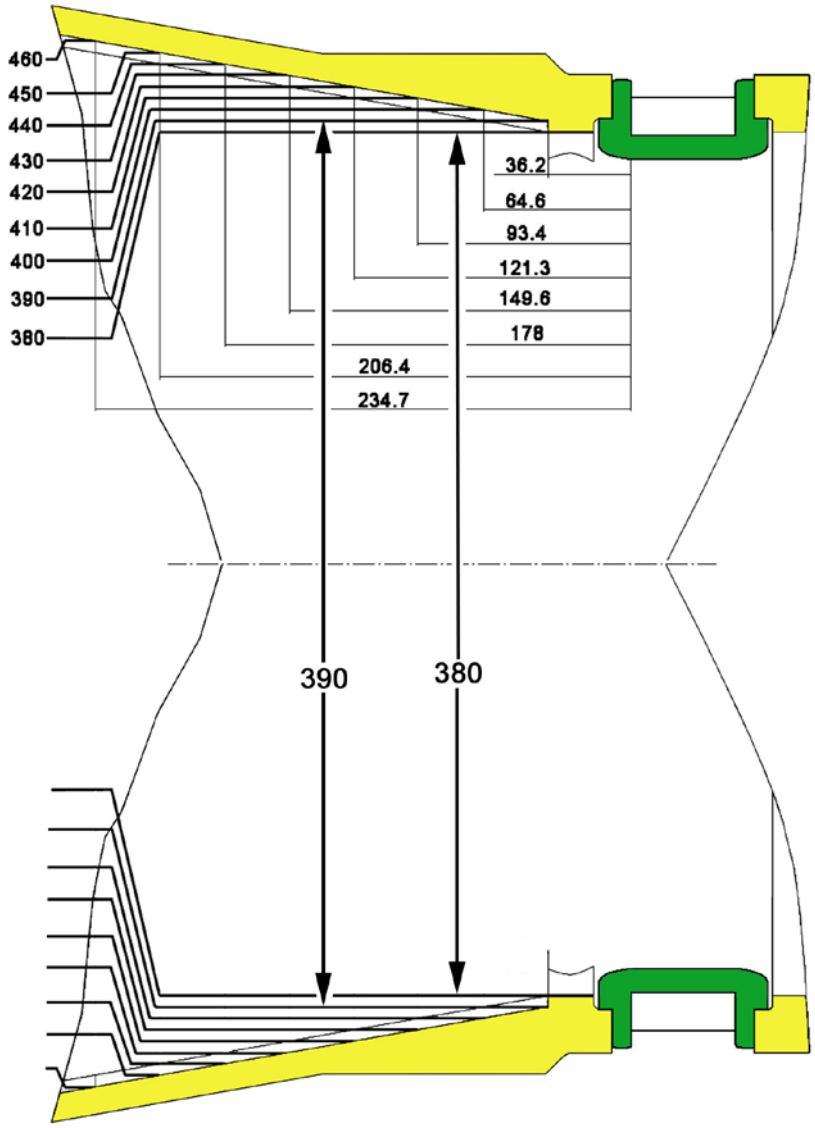


Figure 4-3. Pond Depth Versus Beach Length

To adjust pond depth, proceed as follows:

WARNING! DO NOT OPEN COVER OR ATTEMPT ANY ADJUSTMENT OR MAINTENANCE ON THE CENTRIFUGE UNLESS THE BOWL IS AT A COMPLETE STANDSTILL.

1. Shut down, lock out, and tag out the centrifuge using the Normal Shutdown procedure described later in this section.
2. Remove access plate from the inlet side of the case cover.
3. Loosen screws securing the weir plates (Figure 4-4), move the weir plates to the required weir opening size, and re-tighten screws to torque specified in Section 5.
4. Set all six weir plates to the same diameter.
5. Re-install access plate on case cover.

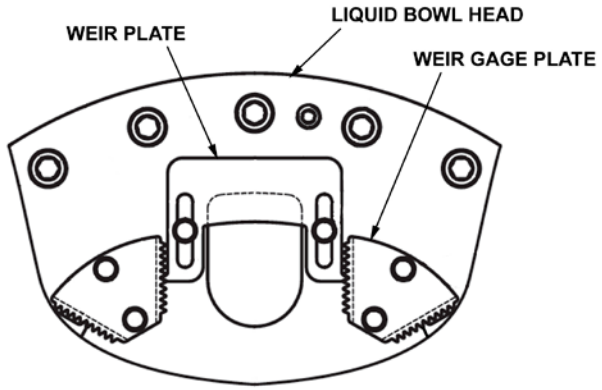


Figure 4-4. Weir Plate Adjustment

Differential Speed/Conveyor Torque

Generally, a faster conveyor speed results in lower conveyor torque, as solids are discharged faster and usually wetter. Reducing conveyor speed must be done slowly and cautiously, allowing steady-state to be reached before further reduction. Slower conveyor speeds permit solids to remain in the bowl longer, which can permit solids to accumulate in the bowl if the input rate exceeds the discharge rate. Therefore, the torque must be monitored to prevent overload.

Operator settings for maximum flow and torque limit determine operating limits for the centrifuge. In flow priority mode, if feed conditions cause the flow rate setting to result in a higher torque than the Input Torque % Limit setting, the control system will automatically switch from flow priority to torque priority mode. The centrifuge will then continue operating in torque priority mode until the operator resets to flow priority mode by clicking on the Input Max GPM cell of the *Operation* screen and changing the flow rate.

At certain conveyor speeds the drive motor must reverse direction to accommodate the differential speed relationship with the bowl. If this occurs, the centrifuge control system automatically assumes control of the feed pump to reduce its flow rate. The message, *Automatic Flowrate*, appears on the Operation screen to alert personnel that the feed pump is under automatic control. When the reduced feed rate is reached, a 20-second timer is started. This delay protects the conveyor drive from overload as the motor changes direction. Upon expiration of the timed interval, the new conveyor differential speed is applied. The pump feed rate returns to the previous rate when the new differential speed is reached. Manual control of the feed pump is then restored. This action releases the feed pump from automatic control and clears the *Automatic Flowrate* message from the screen.

BEARING TEMPERATURES

Bearing temperature trends may be viewed in graphical form on the Bearing Temperature screen (Figure 4-5). Temperatures are updated at one-minute intervals, and scroll buttons are provided to facilitate examination of trends. Solid and liquid end temperatures are displayed at the right side of the screen. The Motor Torque screen is also accessible from the Bearing Temperature screen. The operator may return to the Operation or Home screen using the buttons at the lower right of the screen.

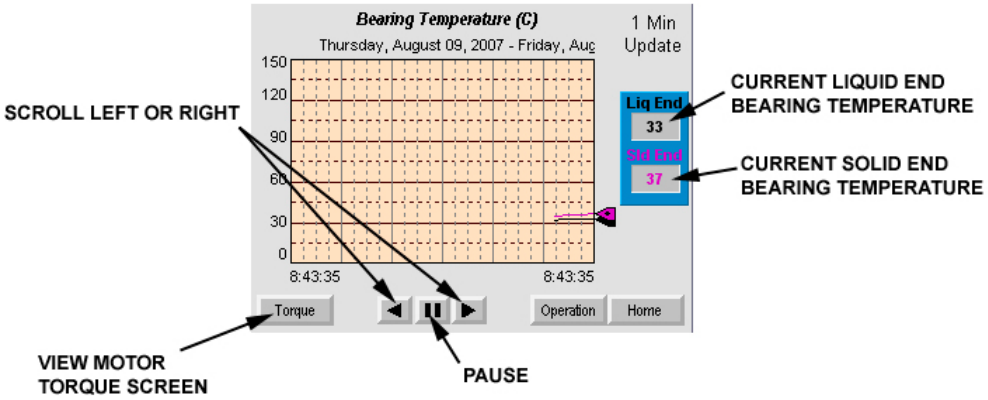


Figure 4-5. Bearing Temperature Screen

MOTOR TORQUE TREND

Bowl and conveyor torque trends may be viewed in graphical form on the Motor Torque trend screen (Figure 4-6). Torque charts are updated at a pre-set one minute interval, and scroll buttons are provided to facilitate examination of trends. Bowl and conveyor torques are displayed at the right side of the screen. The Bearing Temperature screen is also accessible from the Motor Torque screen. The operator may return to the Operation or Home screen using the buttons at the lower right of the screen.

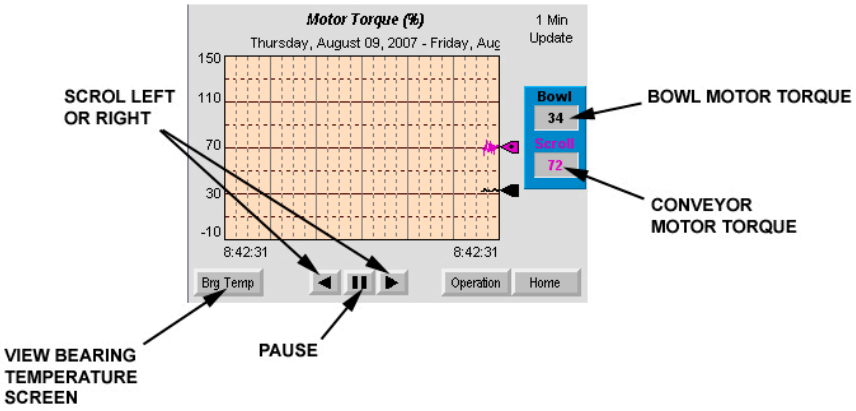


Figure 4-6. Motor Torque Trend Screen

SYSTEM DIAGNOSTICS

Built-in system diagnostics continually analyze the control system for malfunctions. The Diagnostics screen (Figure 4-7) aids in troubleshooting by displaying any fault in the critical areas of the centrifuge. The current operational status of the Bowl, Conveyor, and Pump VFDs, as well as the speed and temperature sensors are displayed on this screen. Analog readings in mA are displayed at the bottom of the screen for main bearing temperature sensors and bowl speed sensor. The screen is accessible from the Home screen.

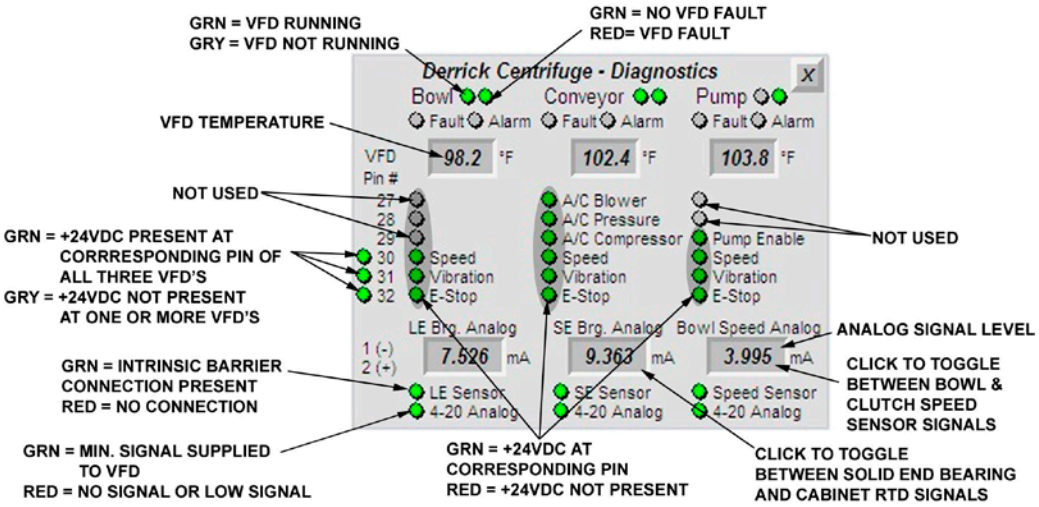


Figure 4-7. Diagnostics Screen

PERFORMANCE STATUS

Current performance information is shown on the Centrifuge Status screen (Figure 4-8). Parameters displayed include bearing temperatures, bowl and clutch speeds and sensor condition, status of safety devices (vibration switch, emergency stop, and bowl overspeed), air conditioner operation, and operating hours. Operating status of the air conditioner is also shown Exiting this screen returns to the previous screen. Safety shutdowns are denoted by color change from green to red and display of a word explaining cause of shutdown.

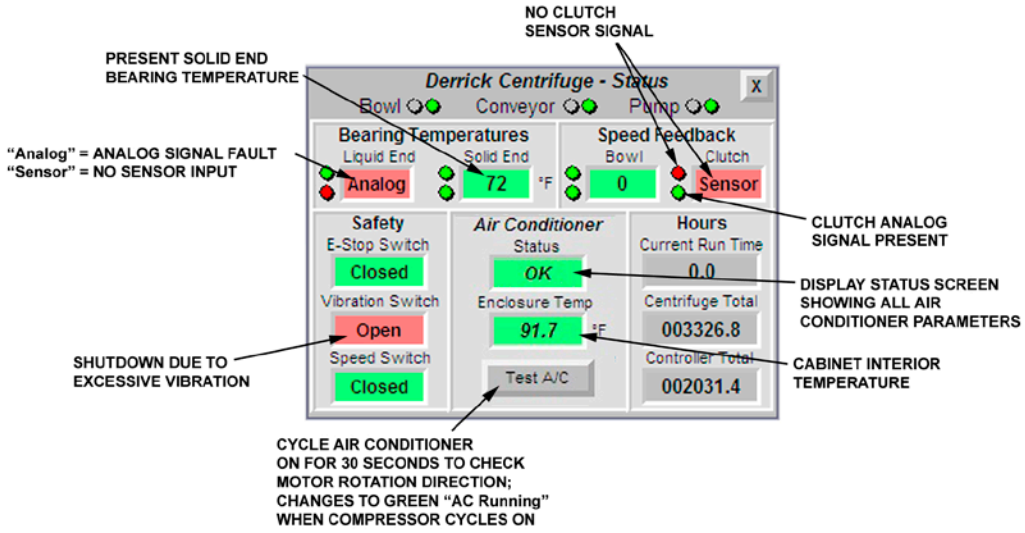


Figure 4-8. Centrifuge Status Screen

ALARM AND FAULT MESSAGES

If an alarm or fault occurs, a banner will appear at the bottom of the *Operation* screen (Figure 4-9) to alert the operator of a malfunction. Alarm messages signify that the prevailing condition must be corrected or the centrifuge may be shut down automatically. Fault messages inform the operator that a failure requiring automatic shutdown has occurred. If desired, the operator may display the present and past alarms and the status of each alarm. The Alarm screens permit the operator to review and acknowledge alarms individually or collectively. Refer to Section 5 for alarm messages and their causes and corrective actions.

Alarms are listed with status, date and time received, and description. Buttons are provided at the bottom of the screen to facilitate scrolling through the alarms (Figure 4-10). Provisions are included for sorting alarms in the order of occurrence, and buttons are included for returning to the *Operation* or *Home* screen.

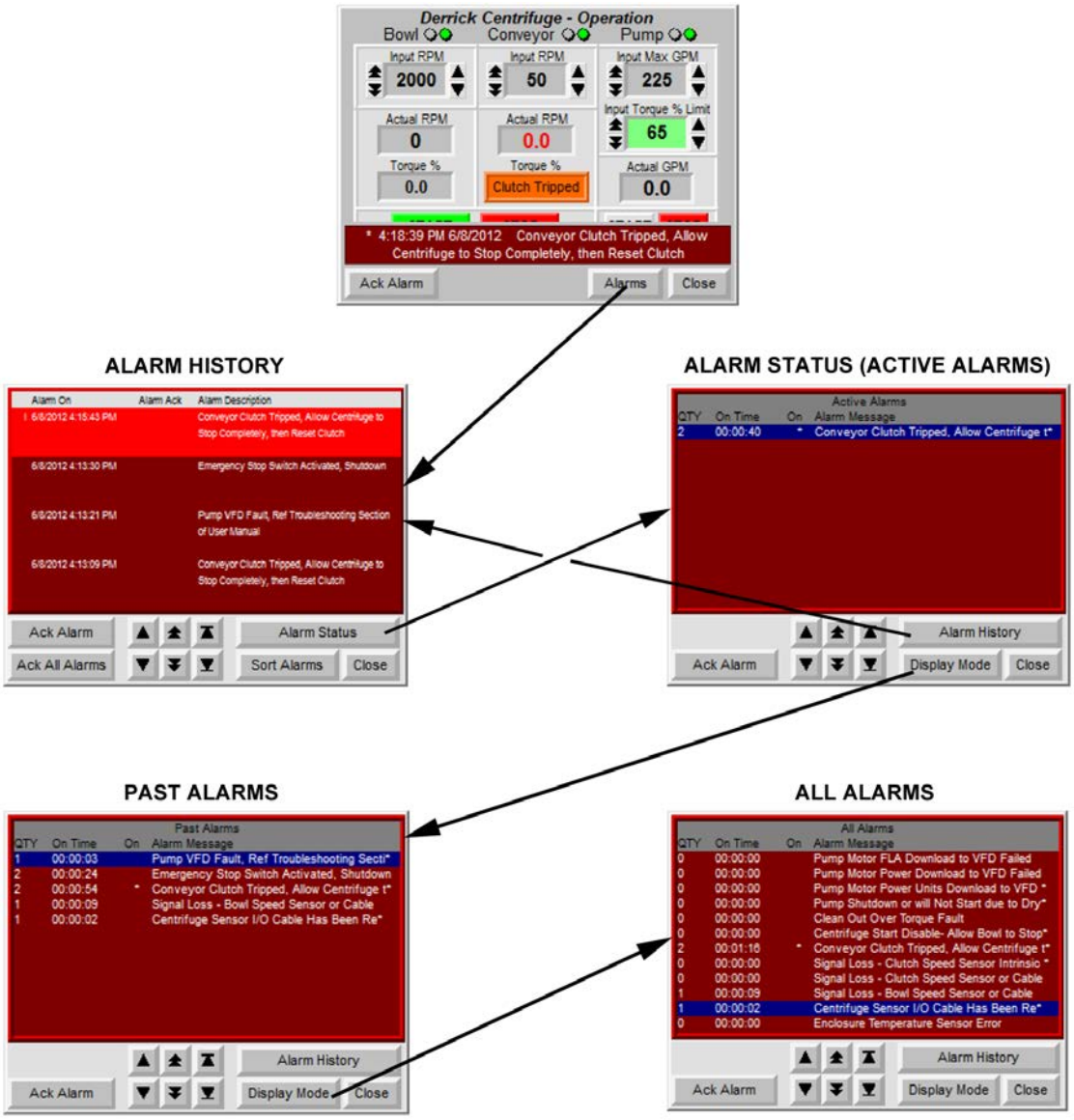


Figure 4-9. Alarm Screens

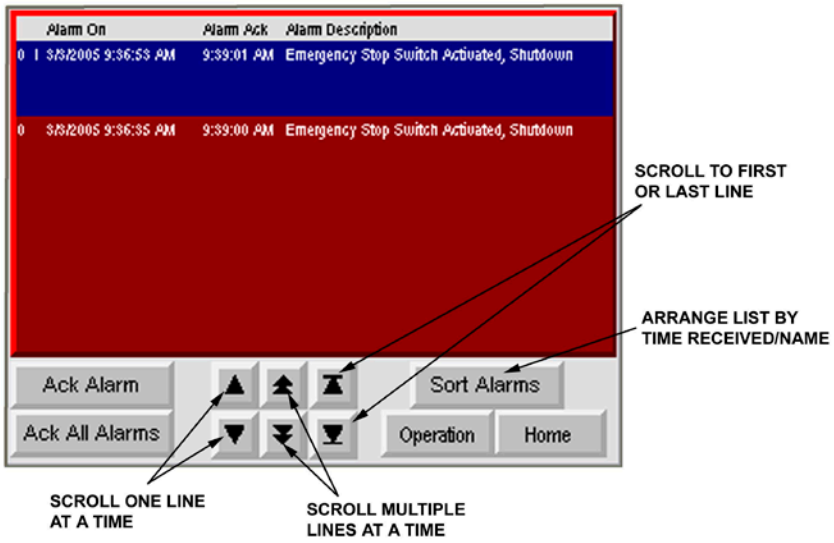


Figure 4-10. Alarm Screen Buttons

VFD STATUS

Status screens (Figure 4-11 through 4-13) are selected from the Operation screen. Each VFD status screen permits the operator to view various operational characteristics of the VFD such as present alarms or faults, power, voltage, and current outputs; motor and component speeds; direction of motor rotation; VFD temperature; and motor torque. If a Fault Code appears, refer to the VFD Alarm and Fault Cross References table at the rear of this section for the definition.

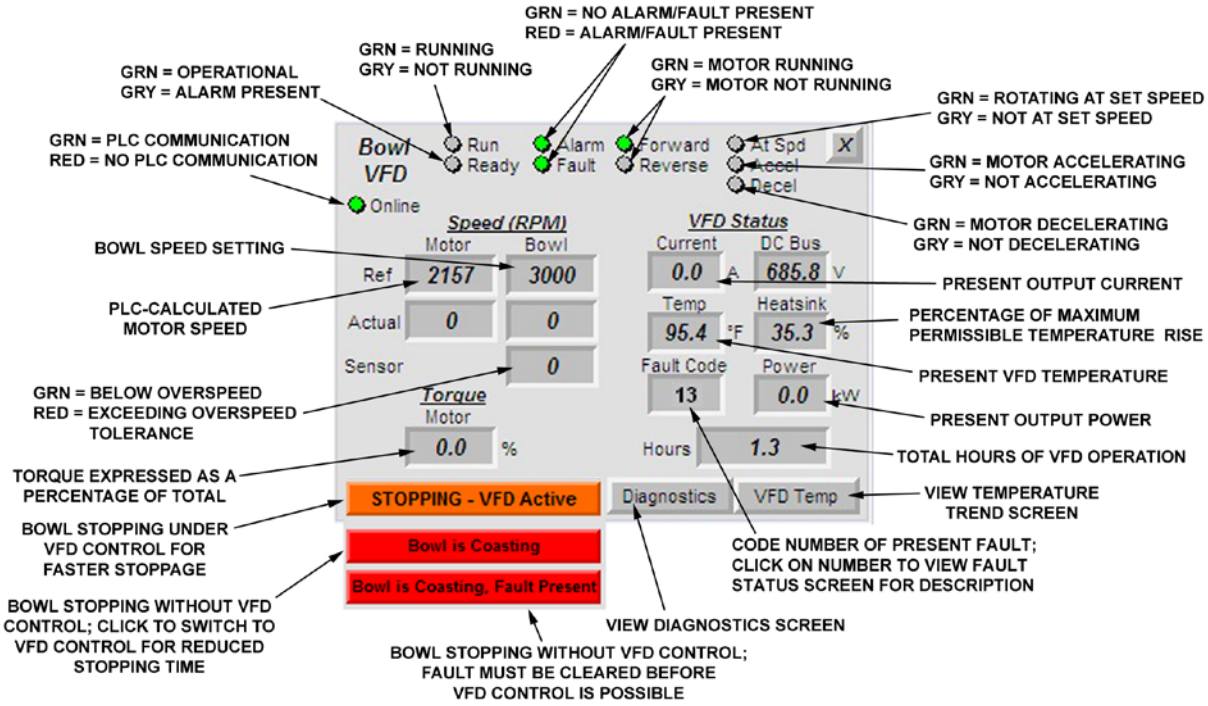


Figure 4-11. Bowl VFD Screen

VFD STATUS (CONT'D)

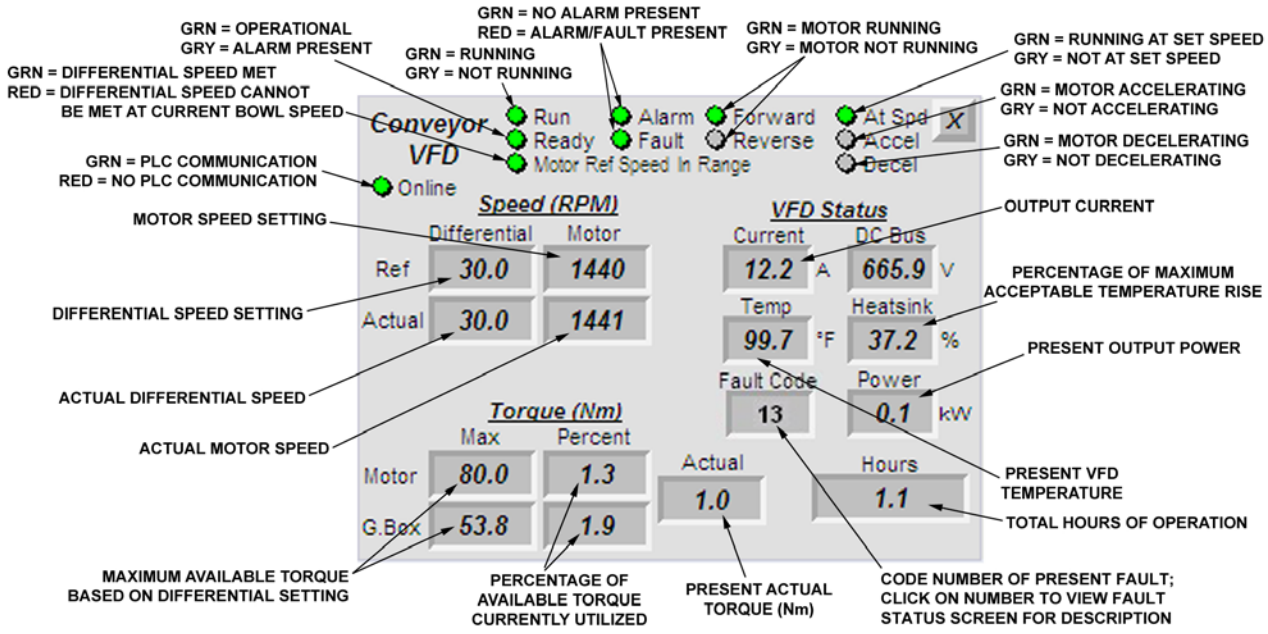


Figure 4-12. Conveyor VFD Screen

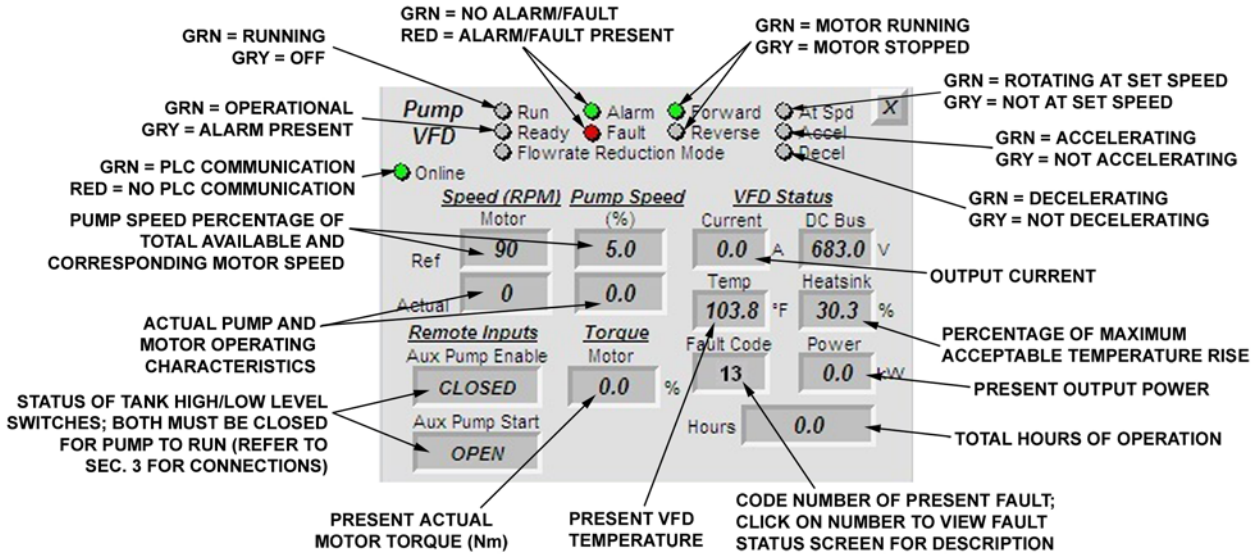


Figure 4-13. Pump VFD Screen

PUMP VFD FAULT STATUS

The three most recent pump faults are shown on the *Pump VFD Fault Status* screen (Figure 4-14). The screen shows the fault number, time of occurrence, and description of the most recent fault. The fault code and time of occurrence are shown for the second and third most recent faults.

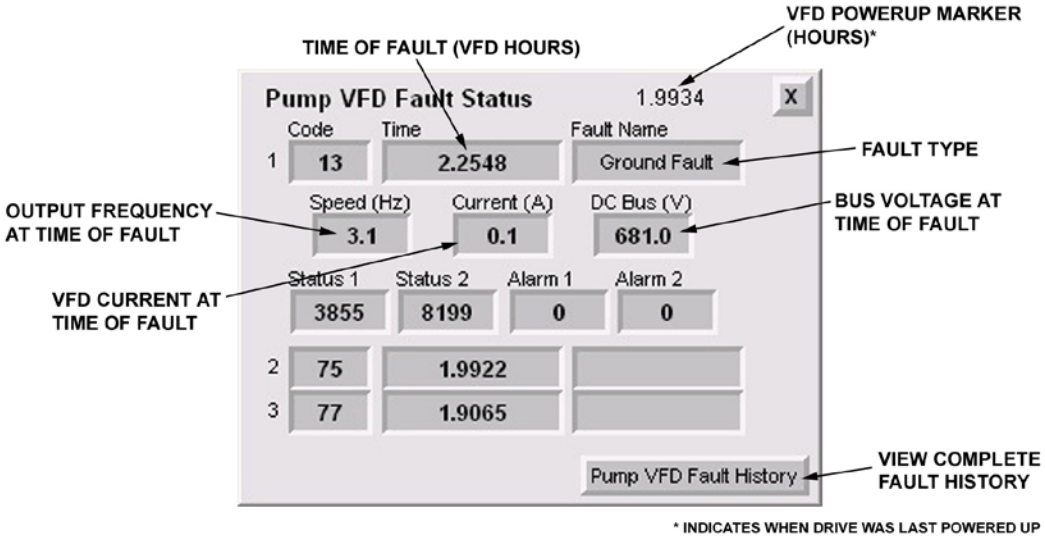


Figure 4-14. Pump VFD Fault Status Screen

VFD TEMPERATURE TRENDS

The historical temperature trends of all three VFDs are shown on the Temperature Trend screen (Figure 4-15). This screen is accessible from the Bowl VFD screen.

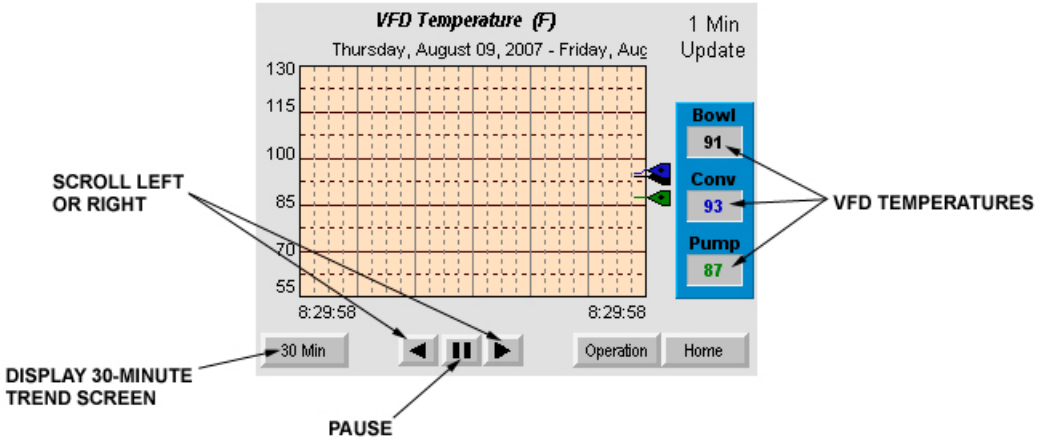


Figure 4-15. VFD Temperature Trend Screen

VFD FAULT RESET

The *Fault Reset* screen (Figure 4-16) informs the operator of the readiness of each VFD—Faulted or No Fault—and permits resetting a faulted VFD. The screen may be selected from either the *Home*, *Clean Out*, or *Operation* screen. After a bowl or conveyor VFD fault, be sure that the centrifuge has come to a complete stop before attempting to re-start.

VFD FAULT RESET (CONT'D)

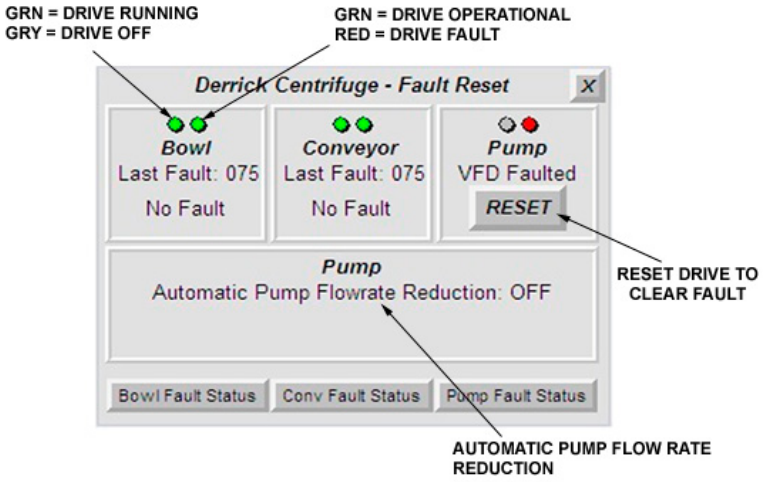


Figure 4-16. Fault Reset Screen

SETUP SCREEN

The *Setup* screen (Figure 4-17) permits the operator to view the software version installed in the PLC and control panel (HMI), view feed pump characteristics, adjust panel brightness, select the temperature units (°C or °F) that will be shown on other screens, and set personal preferences. In addition, by selecting *Login* an authorized operator may access restricted screens. Options are also provided to select the *Pump Setup*, *Diagnostics*, *Home*, or *Login* screens.

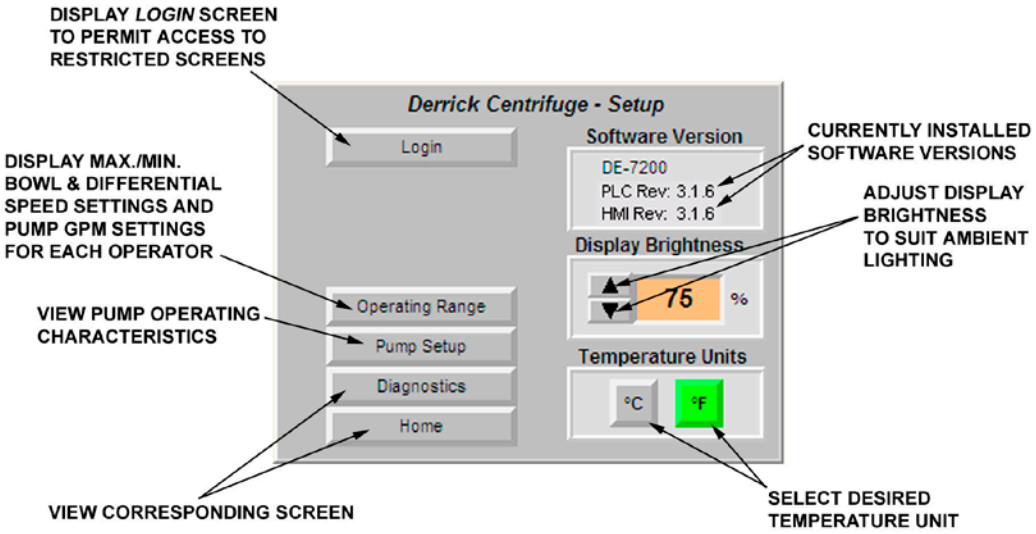


Figure 4-17. Setup Screen

If *Login* is selected, the following *Login* screen will appear:

By entering “User1” for user name and password “1-1-1-1” on the *Login* screen, the operating range screen is displayed (Figure 4-18). The user may then set the maximum and minimum limits for the following parameters:

- Bowl speed
- Conveyor differential speed
- Pump GPM

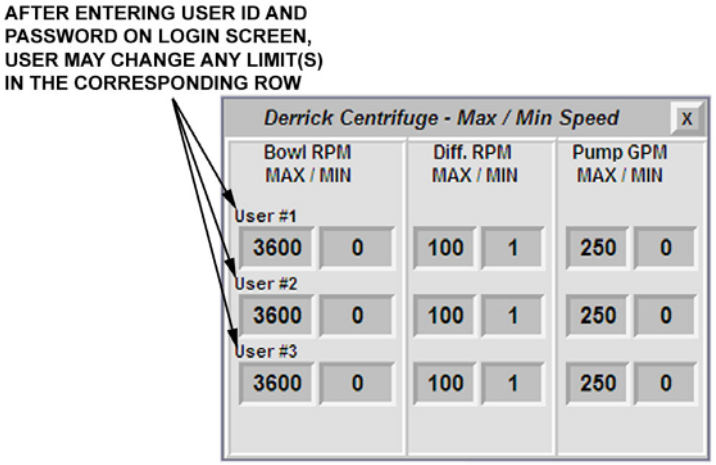


Figure 4-18. Operating Range Screen

PUMP SETUP SCREEN

Pump parameters are input and viewed on the *Pump Setup* screen (Figure 4-19), which is accessed from the *Setup* screen. Information keyed in from the pump and drive motor operating specifications is used by the control system to calculate pump flow rate relative to motor speed and autotune the pump motor to its controlling VFD. Accurate information for the specific pump in use is critical for proper operation. Typically, a flow curve is required to obtain the pump output per revolution parameter.

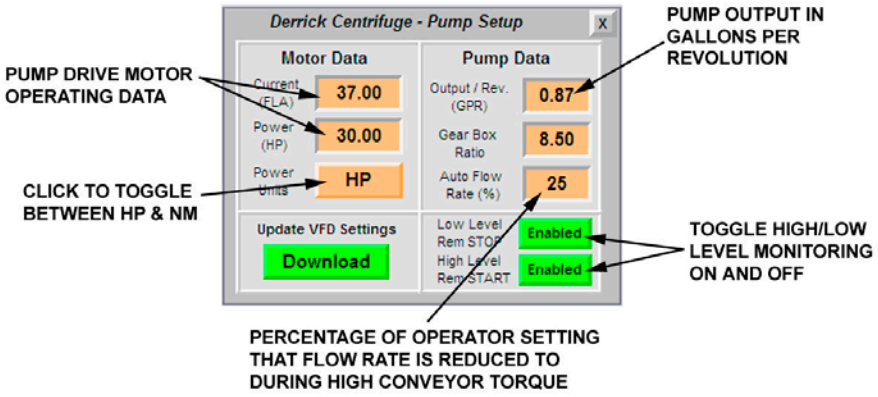


Figure 4-19. Pump Setup Screen

CLEAN OUT

The *Clean Out* screen (Figure 4-20) is used to set parameters for operating the bowl and/or conveyor to remove accumulated process material that is impeding rotation. With this screen displayed, the operator selects the desired bowl and conveyor RPMs for the cleanout process. During cleanout, the actual RPMs and torque percentages are displayed below the setpoints.

CLEAN OUT (CONT'D)

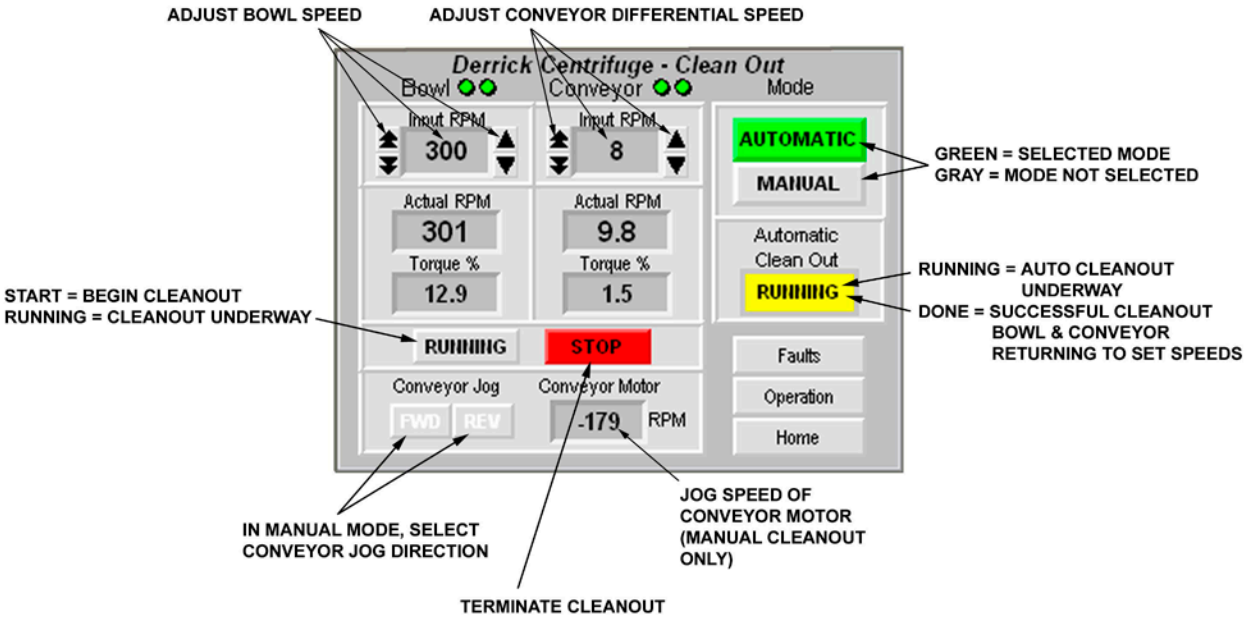


Figure 4-20. Clean Out Screen

Provision is included for selecting the automatic or manual cleanout options. When the cleanout process has timed out or was stopped by the operator, the Operation screen or the Faults screen may be displayed.

If automatic reduction of the pump speed is unable to clear out solids from the conveyor, the torque will continue to rise and the centrifuge will shut down. The clean out procedure should then be used to clear out the impacted solids and return the centrifuge to operational status. The following paragraphs explain the two cleanout options: automatic and manual.

Automatic Cleanout

When the automatic option is selected, the system will perform a cleanout cycle for a pre-set duration. The bowl operates at 300 RPM, while the conveyor operates in the forward direction at a speed that varies from 8 to 30 RPM. If excessive resistance is encountered during the cleanout, the system will stop and alert the operator that the automatic cleanout has been unable to clear the centrifuge. Operator intervention is then required to repeat the automatic cleanout operation.

Manual Cleanout

Note! The manual cleanout should be used only if multiple automatic cleanout attempts are unsuccessful.

When the manual cleanout option is selected, the operator may elect to jog the conveyor in forward and reverse with the bowl set at zero RPM. If desired, however, the operator may choose to operate the bowl as well as the conveyor. Reverse rotation of the conveyor is governed by a timer that terminates reverse operation after a pre-set interval. The primary purpose of the manual cleanout mode is to permit jogging the conveyor in an effort to remove impacted material.

NORMAL SHUTDOWN

The normal shutdown procedure is to be used for controlled stopping of operation. Normal shutdown is performed for routine activities such as cleaning, lubrication, inspection, or adjustment.

Note! Proper shutdown and flushing of the bowl can prevent high vibration at the next startup.

Step	Procedure
1	Stop the feed pump.
2	Open supply of fresh flushing liquid to remove all solids from conveyor and bowl. Continue flushing for 3 to 5 minutes after feed pump has been shut down. Regardless of shutdown duration, the conveyor operates at a pre-set differential speed while the bowl decelerates to a stop. This process cleans the bowl during the shutdown. As the speed gradually drops during the shutdown period, the solids chute can also be flushed. While bowl is rotating, attach a hose to fitting on the hinge side of the case (Figure 3-11) to wash the exterior of the rotating assembly and interior of the case assembly.
3	Select *STOP* on Operation screen to shut down centrifuge. When bowl speed falls to less than 200RPM, conveyor gearbox drive motor automatically shuts down.
4	For cabinet with purge system, maintain air supply to cabinet purge unit to keep cabinet pressurized.

AUTOMATIC SHUTDOWN

The centrifuge has built-in safety features to protect the equipment. These features will result in automatic shutdown of the centrifuge before damage occurs. The following paragraphs describe these automatic shutdowns.

Excessive Vibration

Excessive vibration of the centrifuge will cause the vibration switch to interrupt electric power to the centrifuge run relay, shutting down the machine. Such excessive vibration may occur during startup or normal operation due to slumping of the wall cake or other unbalanced condition of the bowl. The machine may be re-started by pressing the reset button on the vibration switch and then using the Normal Startup procedure above.

If the machine continually trips during normal startup, flush the bowl with fresh water while running the automatic cleanout routine.

Main Bearing Temperatures

Temperature sensors are installed on the liquid and solid end main bearings and connected to the PLC. Bearing temperatures are continuously displayed on the Operation screen. An alarm message is displayed on the control panel when either bearing temperature exceeds 225°F (107°C). If temperature rises to 250°F (120°C), a fault message appears and the centrifuge is shut down. Excessively high bearing temperatures usually indicate bearing failure, which can result from inadequate or excessive lubrication, contamination, or severe wear. Contact Derrick Service department for assistance.

Excessive Bowl Speed

A sensor that detects the rotating speed of the bowl provides an input to the PLC that produces a continuous display of actual bowl speed on the Operation and Bowl VFD screens. A fault message is displayed and the centrifuge is immediately shut down if speed rises to 3100RPM. To re-start the centrifuge, allow the bowl to coast to a complete stop, check for and remove the cause of excessive speed as described in Section 5. After correcting defect(s), re-start the machine using the Normal Startup procedure above, and re-check bowl speed.

Conveyor Clutch Trip

A sensor detects the rotating speed of the torque limiting clutch half installed on the gearbox shaft. The sensor provides an input to the PLC that continuously displays actual clutch speed on the Status and Conveyor VFD screens. If the differential speed between the conveyor drive motor and clutch reaches 50RPM, the clutch speed sensor provides an input to the PLC immediately causing a clutch trip alarm message to be displayed on the control panel. A fault message is then displayed, and the centrifuge is shut down.

To reset the clutch following a trip:

1. Shut down, lock out, and tag out centrifuge, and allow the bowl to coast to a complete stop.
2. Remove four bolts and washers securing shaft guard to centrifuge base, and remove shaft guard to expose clutch.
3. Align the scribe marks on the actuation ring and clutch body (Figure 4-21).
4. Insert two levers (screwdrivers) between the actuation ring and clutch body.
5. Press actuation ring back into engagement.
6. Reinstall and secure shaft guard.
7. Clear all faults, correct any defect(s), and perform Cleanout procedure in this section.
8. Re-start machine using Normal Startup procedure, and re-check clutch speed as shown on the Conveyor VFD screen.

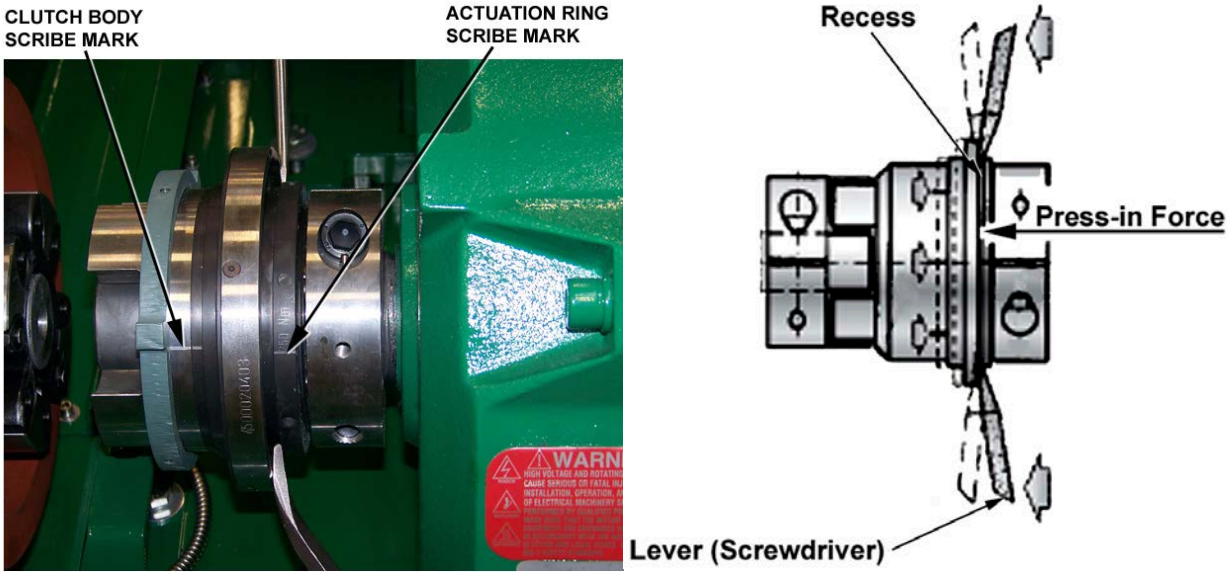


Figure 4-21. Resetting Clutch Following Trip

EMERGENCY SHUTDOWN

Two options are available to stop the centrifuge in an emergency: Electric power shutdown or mechanical shutdown. The type of emergency dictates the shutdown method. If emergency is electricity related, power must be shut down immediately. However, if the emergency requires the fastest possible means of stopping the bowl, the alternative mechanical shutdown procedure should be used to bring the bowl to a stop more quickly.

Electric Power Shutdown

1. Immediately interrupt power by pressing the EMERGENCY STOP button on the control cabinet or centrifuge. The bowl will then coast to a stop, which may take more than 15 minutes.

Note! Pressing EMERGENCY STOP immediately removes power from the bowl, conveyor, and pump motors, allowing the bowl to coast to a stop. This may take more than 15 minutes depending on the bowl speed and amount of material inside the bowl.

2. Open the fused disconnect supplying electric power to the machine.

Mechanical Shutdown

The fastest method to stop the bowl is to click on *STOP* on the *Operation* screen or display the Bowl VFD screen and click on *Bowl Is Coasting*, as shown in Figure 4-22, below. The bowl will then be brought to a controlled stop by the bowl VFD. If a fault is present, the screen will display the message *Bowl Is Coasting; Fault Present*. In this case, the fault must be cleared before VFD control can be selected.

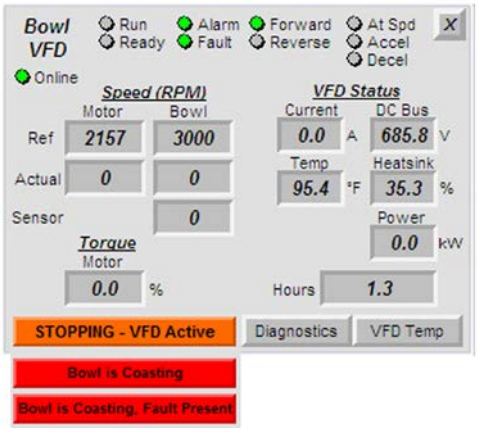


Figure 4-22. Bowl VFD Screen During Shutdown Under VFD Control

Note! If a fault is present, controlled stoppage of the bowl motor is not possible until the fault is cleared.

SECTION 5 - MAINTENANCE

GENERAL

This section describes preventive and corrective maintenance procedures for the DE-7200 VFD centrifuge. Obvious procedures are omitted. Before beginning any centrifuge maintenance, shut down, lock out, and tag out equipment.

	**DANGER! HIGH VOLTAGE! SHUT DOWN, LOCK OUT, AND TAG OUT ELECTRIC POWER, AND ENSURE THAT EQUIPMENT HAS STOPPED ROTATING BEFORE WORKING ON THIS EQUIPMENT.**
	**SAFETY GLASSES MUST BE WORN AT ALL TIMES WHILE PERFORMING ANY MAINTENANCE PROCEDURE. FAILURE TO WEAR SAFETY GLASSES MAY RESULT IN SERIOUS EYE INJURY OR PERMANENT LOSS OF VISION.**
	**WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.**

TOP COVER OPENING/CLOSING PROCEDURES

The proper procedures for opening and closing the top cover of the centrifuge must always be followed. Two operators using both hands are required to open the cover. Derrick recommends having a hoist available if additional assistance is desired during the opening/closing of the centrifuge cover. To open and close the cover, proceed as follows:

1. Shut down, lock out, tag out electric power to centrifuge, and allow rotating assembly to coast to a full stop.
2. Remove bolts securing cover to base.
3. Have two operators using both hands grip the cover handles securely to ensure full control of the cover throughout the opening and closing process.
4. As the cover is raised, ensure that body limbs of all personnel and any other items remain clear of the cover gap at all times.
5. Raise the cover to the fully opened position, and insert a 1/2” (12.7mm) hardened steel pin through one hinge to lock the cover open.
6. After performing the activity that required the cover to be opened, reverse steps 2 through 5 to close the cover. During the closing procedure, ensure that both operators are capable of controlling the cover’s descent and that all body limbs and other items remain clear of the gap.

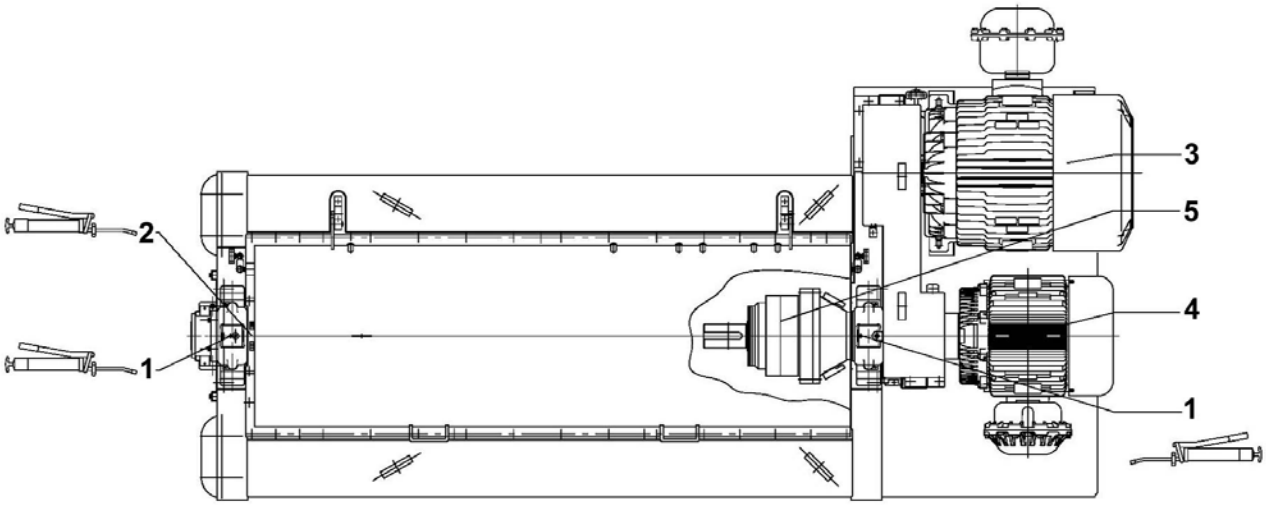
PREVENTIVE MAINTENANCE

Preventive maintenance consists of inspection, cleaning, and lubrication. These routine procedures will ensure maximum life and trouble-free operation. While the maintenance schedule presented in this section should remain flexible, modifications should be based on experience with operating the equipment at your facilities. A maintenance log should be kept to help establish a preventive maintenance schedule, as well as to monitor and adjust the schedule as necessary throughout the equipment's life. When establishing a preventive maintenance schedule, consider duty cycle, ambient temperature, and operating environment. The recommended preventive maintenance schedule is presented in the table below.

PREVENTIVE MAINTENANCE SCHEDULE	
Action	**Interval**
Inspect feed connection for leaks, and tighten connection flange hardware as required.	Each shift
Inspect liquid discharge connection for leaks. Tighten connection to prevent leakage.	Each shift
Remove feed tube, clean interior of pipe, and reinstall.	40 hrs
Remove accumulated solids from interior and exterior of case.	40 hrs or as needed
Remove belt cover, inspect belt for damage, and check/adjust tension.	Every 160 hrs
Inspect clutch coupling spider for wear.	Every 160 hrs
Grease main bearings.	*
Grease conveyor bearing until grease vents through relief valve. (If vent plug is installed, remove plug from conveyor bearing journal, inject grease, and then reinstall vent plug.)	*
Grease bowl and conveyor drive motors.	*
Check/change conveyor drive gearbox oil.	*

* Refer to Lubrication Chart for applicable lubricants, quantities, and intervals.

LUBRICATION CHART



No.	Location	Amount	Interval	Type	Application Notes
1	Main bearings	6 cm^3 (3 strokes)	40 Hrs	Shell Albida EP2	Centrifuge running Manual grease gun
2	Conveyor bearing	Inject grease until it exits outlet port	500 Hrs	Shell Albida EP2	Centrifuge stationary Manual grease gun
3	Bowl drive motor	0.5 Oz (10 shots)	Quarterly	<u>Standard Temp</u> Chevron SRI NLGI 2 SRI-2 <u>Arctic Temp</u> Shell AeroShell 7	Centrifuge stationary
4	Conveyor drive motor				Centrifuge stationary
5	Conveyor drive gearbox	5 qts (4.9 liters)	2500 Hrs	Mobil SHC 629	First oil change after 500 hrs. Change oil with centrifuge stationary; check level when warm (see *Checking Gearbox Oil Level* below)

GEARBOX OIL LEVEL CHECK

1. Ensure that centrifuge is level, and gearbox is warm.
2. Shut down centrifuge, and lock out and tag out electric power.

WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.

3. Remove screws securing top cover to centrifuge, and open cover as described at the beginning of this section.

GEARBOX OIL LEVEL CHECK (CONT'D)

4. Rotate gearbox until the housing marks are at top dead center (Figure 5-1).

Note! Placing a straight edge between grease fitting and housing markings will help align marks at top dead center.

5. Remove fill and vent plugs, and check that oil level is at fill plug opening. If level is low, replenish with recommended oil.
6. Re-install fill and vent plugs, and tighten securely.
7. Close and secure top cover.

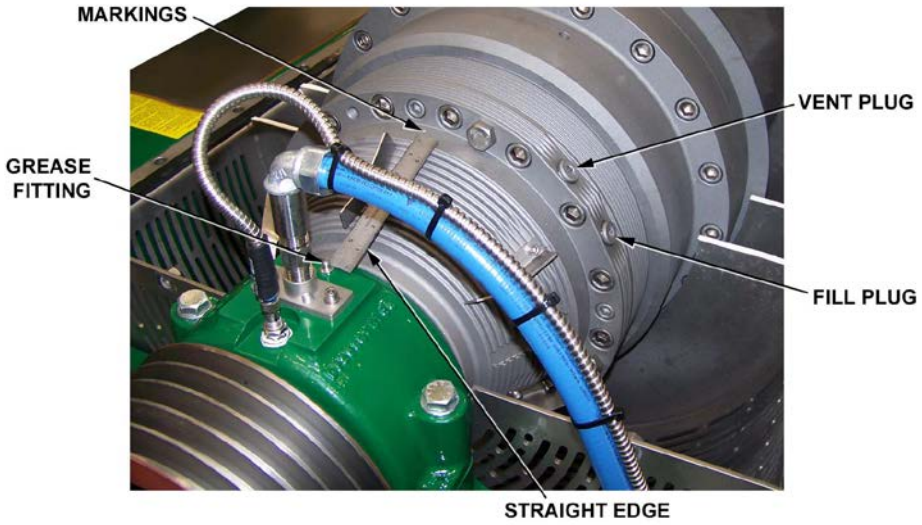


Figure 5-1. Gearbox Oil Level Check

GEARBOX OIL CHANGE

1. Shut down centrifuge, and lock out and tag out electric power.

WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.

2. Remove screws securing top cover to centrifuge, and open cover as described at the beginning of this section.
3. Place a suitable container capable of receiving 5 quarts (4.9 liters) of oil beneath gearbox.
4. Rotate gearbox until one drain plug is at bottom of gearbox.
5. Remove vent and fill plugs at top of gearbox to facilitate draining.
6. Remove drain plug at bottom of gearbox to drain oil.
7. After fully draining gearbox, reinstall and tighten drain plug.
8. Rotate gearbox until fill and vent plugs are positioned as described in *Gearbox Oil Level Check*.

9. Re-fill gearbox with correct product and quantity listed in Lubrication Chart.
10. Re-install fill and vent plugs, and tighten securely.
11. Close and secure top cover.

DRIVE BELT REPLACEMENT

DANGER! HIGH VOLTAGE! SHUT DOWN, LOCK OUT, AND TAG OUT ELECTRIC POWER, AND ENSURE THAT EQUIPMENT HAS STOPPED ROTATING BEFORE WORKING ON THIS EQUIPMENT.

SAFETY GLASSES MUST BE WORN AT ALL TIMES WHILE PERFORMING ANY MAINTENANCE PROCEDURE. FAILURE TO WEAR SAFETY GLASSES MAY RESULT IN SERIOUS EYE INJURY OR PERMANENT LOSS OF VISION.

Before beginning any centrifuge maintenance, shut down, lock out, and tag out equipment. The drive belts should be tensioned periodically and replaced if inspection reveals damage or deterioration. To tension and/or replace the belts, proceed as follows:

WARNING! ALWAYS ALLOW ROTATING ASSEMBLY TO COAST TO A COMPLETE STOP BEFORE REMOVING BELT GUARD.

1. Shut down, lock out, and tag out electric power to the centrifuge.
2. Remove belt guard.
3. Loosen mounting screws securing torque limiter clutch half to conveyor drive motor shaft (Figure 5-2), and slide clutch half toward motor until end of motor shaft is visible.
4. Loosen bolts securing bowl drive motor to base, turn tensioning bolt to loosen belts, and remove belts from bowl and motor sheaves by maneuvering out between conveyor drive motor and conveyor shaft.
5. Install new belts onto bowl drive motor and bowl sheaves.
6. Turn tensioning bolt to apply tension to belt. Apply sufficient belt tension to permit a 1/2” (13mm) deflection when pressed with a 17 lb (75 N) force at the midpoint of the belt (Figure 5-3). Correct tension will prevent slippage without overloading bearings. After correct tension is set, tighten motor base retaining bolts to secure motor.
7. Slide drive motor clutch half back into engagement with gearbox half, and set gap between clutch halves at about 0.1875” to 0.250” (4.8mm to 6.4mm), and then position clutch axially so that midpoint of spider is aligned with proximity switch.
8. Tighten mounting screws in motor clutch half to 184 ft lbs (250 Nm).
9. Install and secure belt guard.

DRIVE BELT REPLACEMENT (CONT'D)

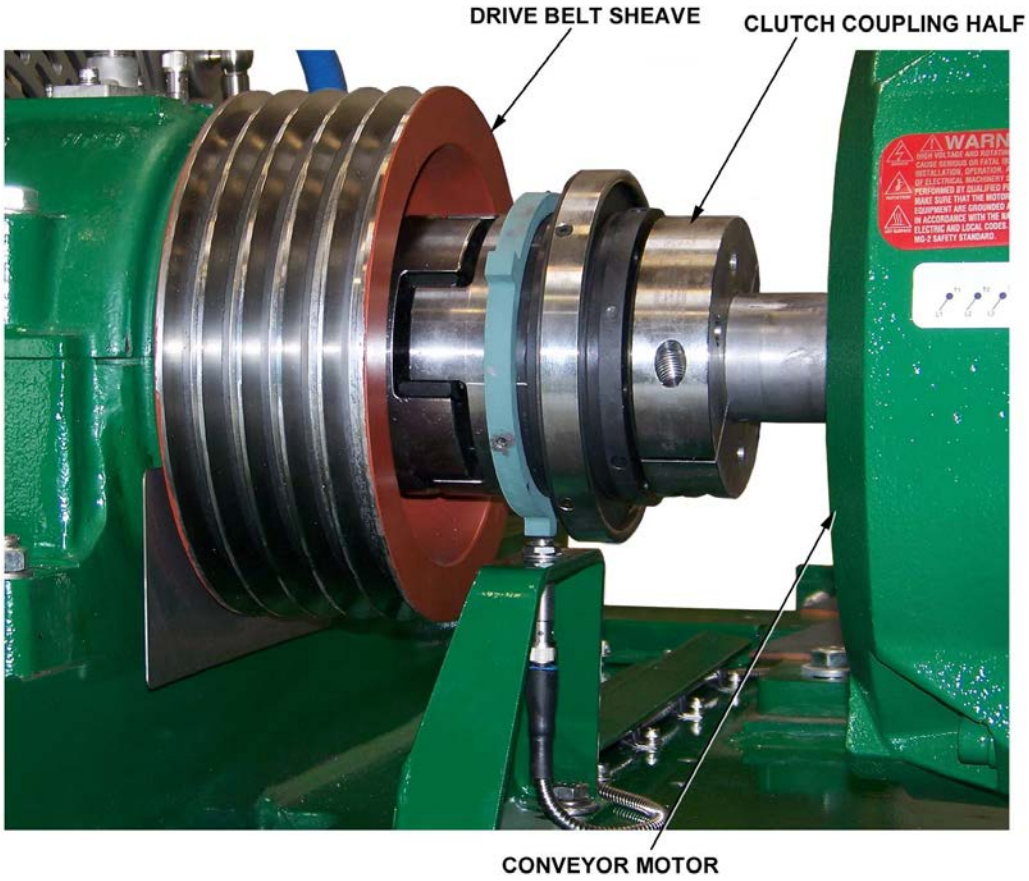


Figure 5-2. Conveyor Drive Clutch

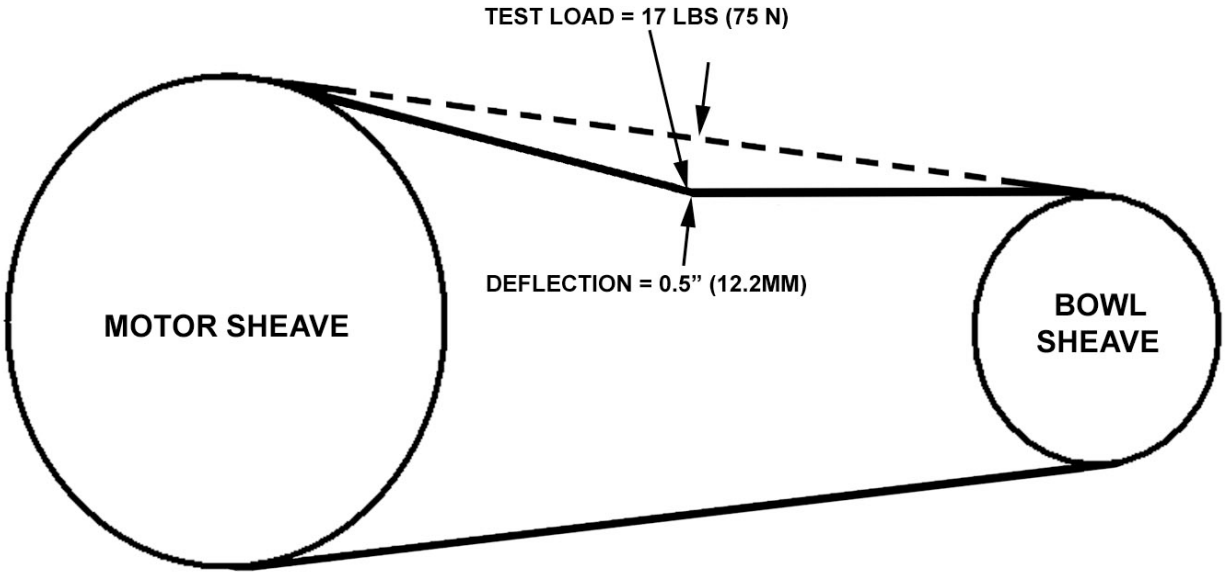


Figure 5-3. Drive Belt Tensioning

PURGE SYSTEM

Bypassing Purge System

The purge unit may be bypassed when necessary to apply electric power to the centrifuge while the control cabinet door is open, but **this should be done only after verifying that the centrifuge is in a non-hazardous area**. After completing the work, the purge system must be restored to operation and satisfactory operation confirmed. Refer to Section 4 for the purge system bypass procedure.

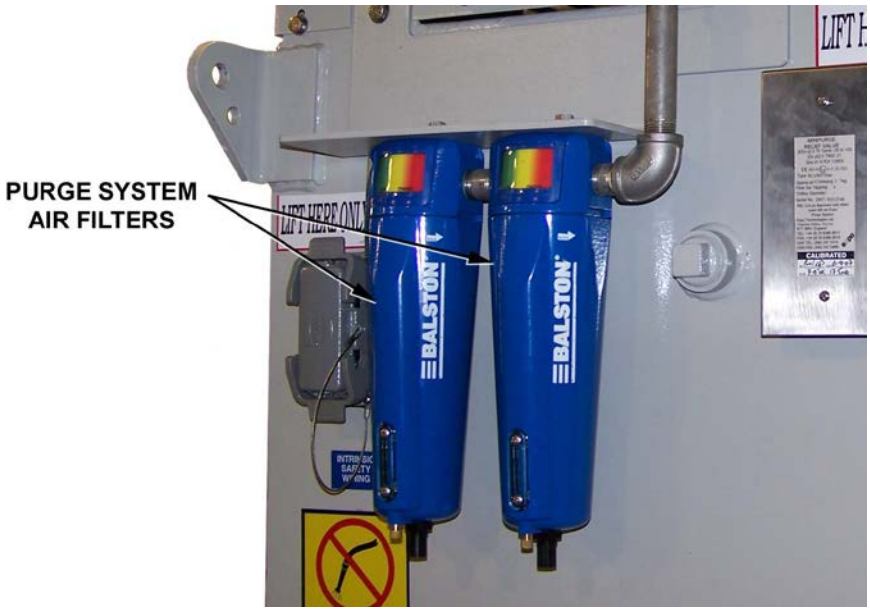
	**DANGER! HIGH VOLTAGE! USE EXTREME CAUTION WHEN OPERATING CENTRIFUGE WITH PURGE SYSTEM BYPASSED. DANGEROUSLY HIGH VOLTAGE WILL BE PRESENT IN CONTROL CABINET IF DOOR IS OPENED WHILE POWER IS APPLIED.**
	**EXPLOSION HAZARD! BE CERTAIN THAT SURROUNDING ATMOSPHERE IS CLEAR OF ALL POTENTIALLY EXPLOSIVE GASES BEFORE OPENING CONTROL CABINET DOOR.**
	**SAFETY GLASSES MUST BE WORN AT ALL TIMES WHILE PERFORMING ANY MAINTENANCE PROCEDURE. FAILURE TO WEAR SAFETY GLASSES MAY RESULT IN SERIOUS EYE INJURY OR PERMANENT LOSS OF VISION.**

Inspection and Test Procedures

Periodic inspection and test procedures, supplemented by any additional requirements imposed by local codes, are recommended. The following tests should be performed at least every 6 to 24 months depending on site conditions.

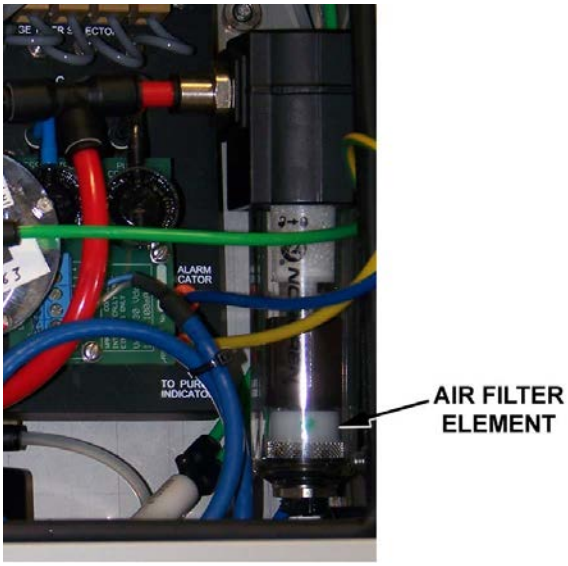
Visual Inspection and Checks

1. Inspect condition of relief valve and spark arrestor. Remove all debris and corrosion.
2. Check/drain air supply filters on cabinet exterior.



Visual Inspection and Checks (Cont'd)

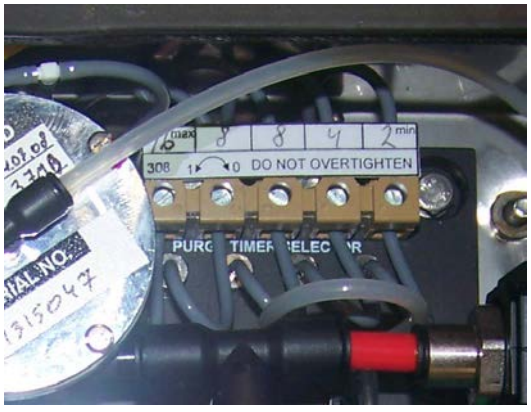
3. Check condition of the purge unit air filter element, and clean or replace as necessary.



4. At least every two years, check the following additional items:
   a. There are no unauthorized modifications.
   b. Quality of the air supply is correct (refer to *Compressed Air* in Section 3).
   c. Approval labels are legible and undamaged.
   d. Power to the centrifuge is shut down upon loss of air pressure.

Initial Purge Time Setting

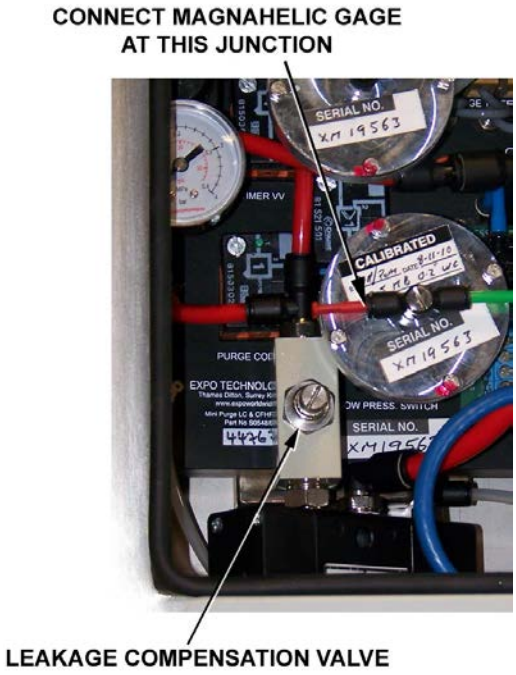
The initial purge time is factory-set to 16 minutes. If purge time varies excessively, the timer system inside the purge unit may be adjusted to restore the correct interval. The time intervals marked on each valve are additive. In the photo below, the timer shows that total purge time available is 38 minutes (16+8+8+4+2). If testing reveals that purge time has varied from the 16-minute setting, the purge time should be changed by opening or closing one or more valves. When making an adjustment, note that valves are either open or closed; no intermediate setting is possible.



Leakage Compensation Test

A Magnahelic gage and hose kit available from Derrick is required to monitor cabinet pressure. The leakage compensation valve adjustment should be checked for deviation from factory setting as follows:

1. Connect Magnahelic gage to test point shown below.



2. Open the supply regulator to between 60 and 115 psi (4 and 8 barg) to start the purge flow.
3. Check that the internal logic gage reads 30 psi (2 bar).
4. At this time the ALARM/PRESSURIZED indicator should be green and the PURGING indicator should be amber. If the amber indicator remains off, the flow through the relief valve is below the minimum for which the flow sensor has been calibrated. Check the air supply pressure at **the inlet to the control unit while purging is taking place**. It must be above the minimum specified pressure.
5. The purge timer will start as soon as the PURGING indicator turns amber. Check that the time delay between the PURGING indicator turning amber and the application of power to the control cabinet is not less than the minimum time required for purging the cabinet. Times in excess of the minimum are permitted, and a tolerance of +20% is normally acceptable. If the time is too short it must be increased accordingly.
6. After power has been applied via the control unit the purging valve will close, and the air flow into the cabinet will be controlled by the leakage compensation valve.
7. SLOWLY open the leakage compensation valve, and allow cabinet pressure to rise until the relief valve opens. Check that the relief valve opens at or below 7" ±0.8" WC (17.4 mbarg ±2 mbarg).
8. Repeat the relief valve test several times.

Minimum Pressure Sensor Setting

The setting of the minimum pressure sensor should be checked as follows:

1. Note the position of the leakage compensation valve knob by marking knob with a pencil at the 12:00 o'clock position.
2. Slowly lower the cabinet pressure by closing the leakage compensation valve further, counting the number of turns from the normal working pressure position. Note the pressure at which the alarm/pressurized indicator changes from green to red, and check that this pressure is not lower than 0.3" WC (0.75 mbar). Check also that the ALARM electrical contacts function properly.
3. As soon as the ALARM/PRESSURIZED indicator turns red, the system will begin re-purging, and the enclosure power will be switched off.
4. While the cabinet is re-purging, return the leakage compensation valve to its normal working pressure position so that at the end of purging the cabinet pressure should immediately settle down at the correct normal pressure.

Leakage Compensation Valve Adjustment

1. If a considerable quantity of air continues to flow out the relief valve after power has been applied, the leakage compensation valve is open too far causing the air flow to hold the relief valve open continuously. To correct this condition, slowly close the leakage compensation valve. The cabinet pressure will start to fall as the flow decreases but eventually the relief valve will close, and the cabinet pressure will rise again. At this point, the relief valve may start to open intermittently as the cabinet pressure rises to the point where it exceeds the relief valve opening pressure. When the relief valve opens, the pressure will fall quickly to the point where the relief valve re-closes and the cabinet pressure starts to rise again.
2. If the relief valve is opening intermittently, the leakage compensation valve is open slightly too far. When the relief valve opens, the cabinet pressure falls quickly to the point where the relief valve re-closes and the cabinet pressure starts to rise again. Continue to close the leakage compensation valve until the cycling stops and the cabinet pressure starts to fall. Carefully adjust the leakage compensation valve until the cabinet pressure is stable. This pressure will be the normal working pressure and should be about 7" WC (17.4 mbarg).
3. If, at the end of purging, cabinet pressure falls below the minimum pressure sensor setting, the system will re-start a new purge cycle. This indicates excessive leakage from the cabinet. In this case, check the cabinet for leakage, and reduce or eliminate the leaks. After sealing cabinet, at the end of purging the cabinet should remain pressurized and the relief valve action will occur as described in step 1 or 2, above. Proceed with adjustments described in the preceding steps.

Note! When air conditioner goes off, the relief valve may vent momentarily. This is normal.

Pressure Sensor Calibration

If it is decided that the minimum pressure sensor requires recalibration, it must be returned to Derrick for this service.

Cleaning Purge Unit Filter

Do not use solvents on any part of the filter assembly installed inside the purge unit. To clean the filter element, unscrew and remove the filter bowl and then unscrew and remove filter element. Clean filter element in soapy water or replace element.

ROTATING ASSEMBLY MAINTENANCE

Maintenance of the rotating assembly is limited to removal, cleaning, inspection, and replacement of wear inserts. Excessive noise or vibration during centrifuge operation may indicate defective main or conveyor bearings. If such conditions are evident, the bearings should be checked for high temperature and excessive noise. The rotating assembly must be replaced if defective main or conveyor bearings are found, or if internal damage to the rotating assembly is found or suspected. The damaged rotating assembly should be returned to Derrick for overhaul.

Rotating Assembly Removal

To remove the rotating assembly, proceed as follows:

WARNING! TO AVOID SERIOUS PERSONAL INJURY BE SURE EQUIPMENT IS LOCKED OUT, TAGGED OUT, DE-ENERGIZED, AND HAS STOPPED ROTATING BEFORE PERFORMING MAINTENANCE AND/OR ADJUSTMENTS.

1. Turn off feed, shut down centrifuge, and lock out and tag out electric power to the centrifuge. Allow rotating assembly to coast to a full stop.
2. Disconnect feed pipe from feed tube flange.
3. Remove screws securing belt guard to case, and lift and remove guard.

WARNING! WHILE OPENING AND CLOSING THE CENTRIFUGE COVER, PERSONNEL MUST ENSURE THAT ALL BODY LIMBS AND ANY OTHER ITEMS ARE CLEAR OF THE COVER GAP. TWO OPERATORS MUST BE USED, WITH BOTH HANDS ON THE COVER HANDLES AT ALL TIMES. DERRICK RECOMMENDS HAVING A HOIST AVAILABLE IF ADDITIONAL ASSISTANCE IS DESIRED DURING THE OPENING/CLOSING PROCEDURE.

4. Remove screws securing case cover to case, and open case cover as described at the beginning of this section.
5. Loosen screws securing torque limiter clutch half to conveyor drive motor shaft (Figure 5-4), slide coupling half toward motor until end of motor shaft is visible, and remove spider.

Rotating Assembly Removal (Cont'd)

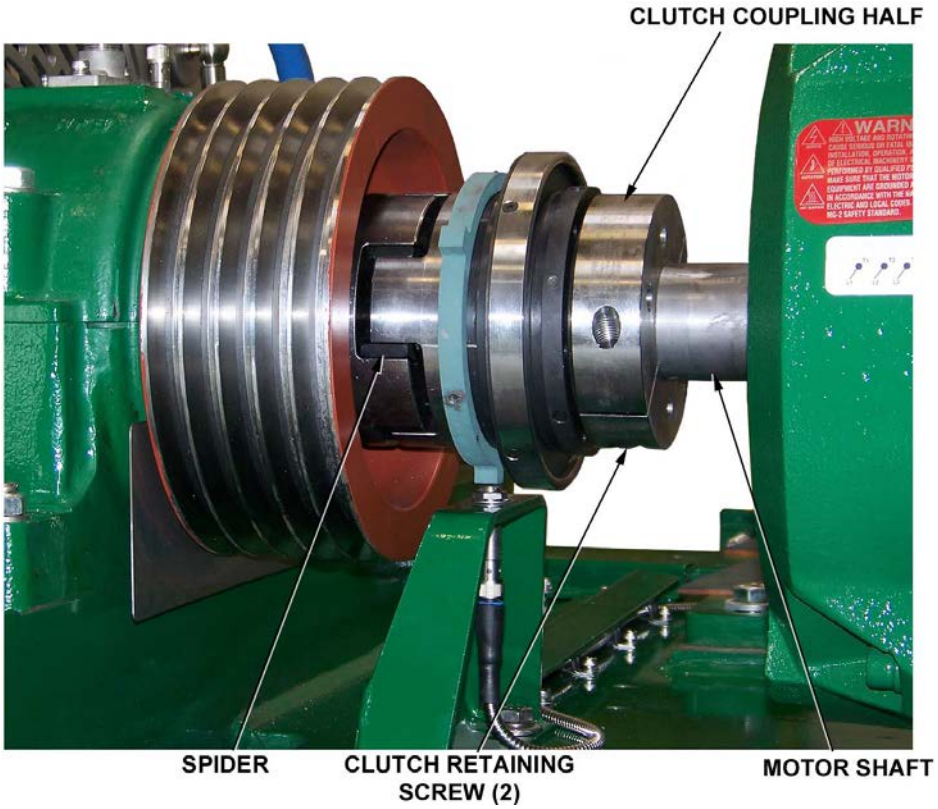


Figure 5-4. Conveyor Torque Limiter Clutch

6. Loosen nuts securing bowl drive motor to base, turn tensioning bolt to release tension, and remove belts from bowl sheave.
7. Remove liquid and solid end temperature sensors (Figure 5-5) from main bearing pillow blocks.

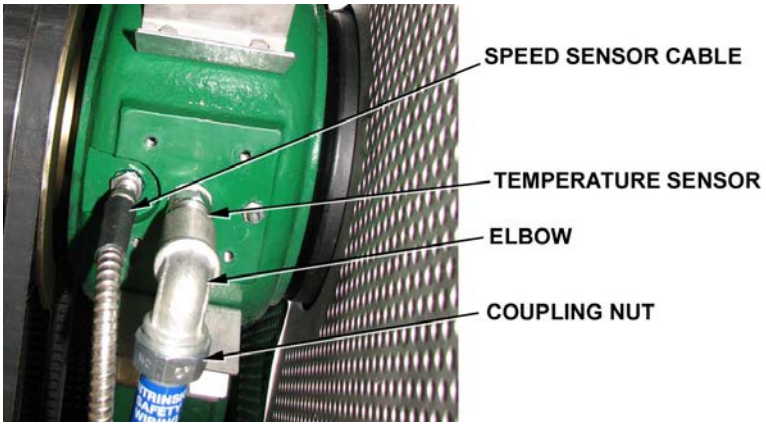


Figure 5-5. Solid End Temperature and Speed Sensors

8. Disconnect speed sensor cable from speed sensor.
9. Remove bolts and Belleville washers securing pillow blocks to base at liquid and solid ends (Figure 5-6), and remove alignment pins from pillow blocks.

10. Attach a hoist capable of lifting at least 4000 lbs (1800 kg) to rotating assembly.
11. Properly balance the hoisting straps to ensure that the assembly remains horizontal during lifting, and slowly hoist rotating assembly until clear of base.
12. Lower rotating assembly onto a cradle that is capable of supporting its weight.

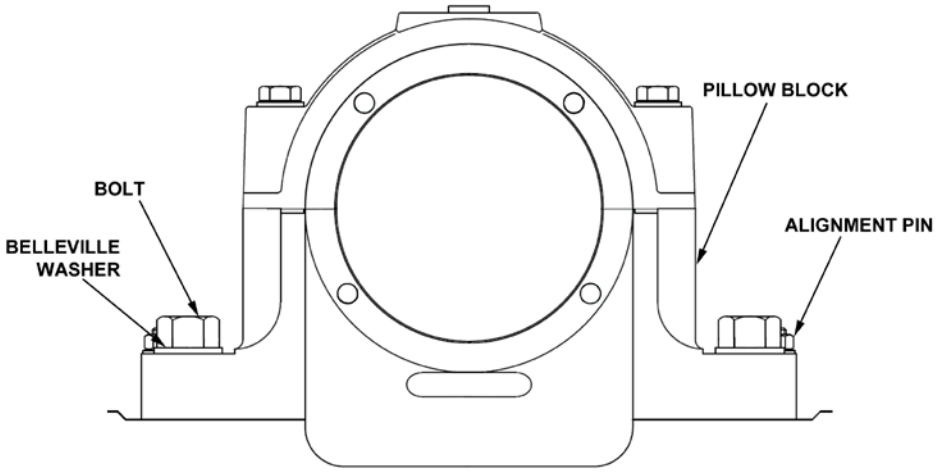
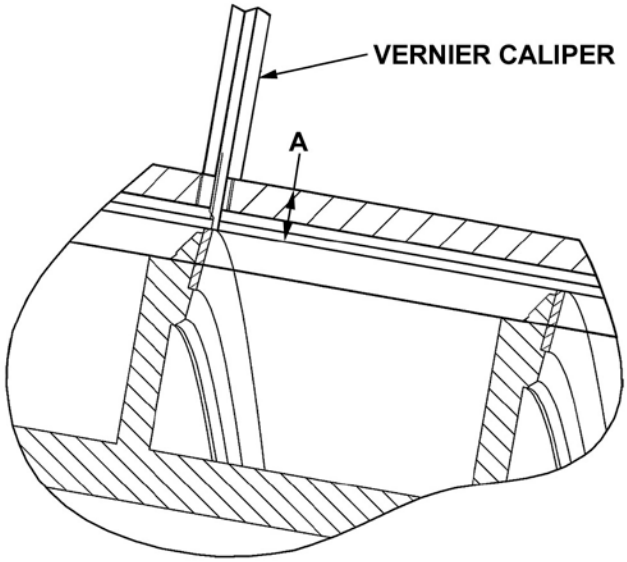


Figure 5-6. Bearing Pillow Block

Cleaning and Inspection

1. Wash mud and debris from interior and exterior of bowl assembly, and blow dry with filtered compressed air. Remove any corrosion to facilitate inspection.
2. Inspect wear inserts for obvious wear. If significant damage is found, replace inserts using Kit G0009149. To help preserve dynamic balance, inserts are always replaced in pairs that are opposite to each other.
3. Inspect solid discharge wear inserts and weir plates on head wall of bowl assembly for cracks, fractures, or other damage, and replace if obviously damaged using Kit G0009149.
4. Inspect bowl exterior for corrosion, excessive wear, or other damage that may affect performance. Contact Derrick if excessive corrosion or wear is found.
5. Check main bearings for roughness, noise, or rubbing. If bearing damage is found, replace rotating assembly in accordance with procedures in this section. Return defective rotating assembly to Derrick for overhaul.
6. Inspect pillow blocks for corrosion, distortion, nicks, cracks, burrs, fractures, or other defects. Repair any minor defects, or replace if serious defects or cracks are found.
7. Determine wear of conveyor flights as follows:
   a. Remove inspection plug from bowl extension, and insert vernier caliper through hole and into contact with conveyor flight (Figure 5-9).
   b. The dimension indicates the radial wear of the flights. For example, a dimension of 24.2mm indicates radial wear of 5mm.
   c. If radial wear exceeds 6mm, the rotating assembly should be returned to Derrick for overhaul.

Cleaning and Inspection (Cont'd)



A (mm)	Radial Wear (mm)
19.2	0
20.2	1
21.2	2
22.2	3
23.2	4
24.2	5
25.2	6
26.2	7
27.2	8
28.2	9
29.2	10

Figure 5-9. Conveyor Flight Wear Measurement

Installation

1. Using a suitable hoist capable of lifting at least 4000 lbs (1800 kg), lift rotating assembly from cradle and lower onto base with pillow blocks in close alignment with mounting holes.
2. Use a brass hammer to fully seat alignment pins in bearing pillow blocks and base; do not tighten nuts on alignment pins.
3. Orient Belleville washers with concave side down, and slide onto bolts. Insert bolts through pillow block holes, and tighten in stages to torque specified in *Hardware Torque Specifications*.
4. Install and tension drive belts between motor and bowl sheaves in accordance with *Drive Belt Replacement*.
5. Insert spider into gearbox clutch half, and slide motor clutch half back into engagement with gearbox half. Set gap between clutch halves at about 0.1875" to 0.250" (4.8mm to 6.4mm), and tighten mounting screws in motor clutch half to 184 ft lbs (250Nm).
6. Install and secure belt guard over motor and bowl assembly sheaves.
7. Close case cover, and secure with screws, tightening from center of cover outward in both directions.
8. If main bearings have been replaced, grease main bearings in accordance with lubrication chart in *Preventive Maintenance* and the following steps:
   a. Apply electric power, start centrifuge, and adjust bowl speed to 500RPM.
   b. While watching bearing temperature, inject new grease into pillow block until grease flows from the outlet port on the bottom half of the pillow block.
9. Connect feed piping to feed component flange.
10. Apply electric power, and start up centrifuge (refer to Section 4). Carefully monitor performance, and check for any unusual noise.

HARDWARE TORQUE SPECIFICATIONS

Use only hardware that is approved by Derrick Corporation. The use of potentially inferior, non-Derrick approved hardware may result in serious injury to personnel and/or damage to equipment. Additionally, any warranty in force, whether written or implied, may be voided by use of unapproved hardware. Contact Derrick Corporation with questions pertaining to hardware type and usage associated with Derrick centrifuges.

WARNING! USE OF INFERIOR, NON-DERRICK APPROVED HARDWARE MAY RESULT IN SERIOUS INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

Recommended seating torque specifications for the various types and sizes of hardware used on the centrifuge are shown below.

Use the following procedure when tightening hardware:

1. Use only a calibrated torque wrench.
2. When tightening more than one bolt, alternate tightening between bolts.
3. Always approach the final torque in several stages.

HARDWARE TORQUE				
Type	**Location**	**Torque**		
		Ft lbs	**In lbs**	**Nm**
M12	Bowl and backdrive gearbox motors to base	41	496	56
M10	Weir plate to liquid bowl head	24	283	32
M12	Top cover to case	24	283	32
M10	Sheave to mounting flange on backdrive gearbox	24	283	32
M24	Main bearing pillow block to base	502	6018	680
M12	Feed tube to pillow block	55	650	75
M16	Top and bottom halves of main bearing pillow block	144	1726	195
M14	Clutch coupling half to conveyor motor shaft	184	2208	250

RECOMMENDED SPARE PARTS

The spare parts list below contains the parts required to support a single DE-7200 centrifuge for two years. The components most susceptible to wear are included; however, all potential part replacements cannot be predicted. The complete spare parts inventory should be based on the user's experience with similar equipment. When establishing a spare parts inventory, consider duty cycle, ambient temperature, and operating environment.

RECOMMENDED SPARE PARTS (CONT'D)

Part No.	Description	Consumable	2-Yr Qty
Base - 16601-00-001			
G0007725	Taper Pin	No	4
Bowl - 16603-00-001			
G0008986	Gear Oil	Yes	5 Gal
G0007763	Bolt, Hex Head	No	12
G0007729	Washer, Flat	No	12
Case & Cover - 16602-00-001			
G0007759	Seal Tape	Yes	1
16929-01	Rubber Seal	No	1 Set
G0007767	Gas Cylinder	No	2
16995-01	Wear Plates	No	1 Set
Belt Guard - 16605-00-001			
G0007756	Bolt, Hex Head	No	4
G0012501	Flat Washer	No	4
Feed Component Assembly - 16606-00-001			
G0012473	Feed Tube	Yes	1
G0009232	Flex Joint, ANSI Pattern	Yes	1
Miscellaneous Drive Components - 16621-00			
G0007964	Drive Belt	Yes	5
G0008994	Overload Clutch/Coupling	No	1
Miscellaneous Parts - 16674-00			
G0008185	Grease Cartridge	Yes	20 Tubes
G0008181	Grease Gun	No	1
Electrical Parts List - 16593-00			
G0007265	RTD Sensor, Bearing, 5", 316SS, 140" Wire	No	1
G0007861	Speed Sensor	No	1

Part No.	Description	Consumable	2-Yr Qty
Control Cabinet - 16472-00-002			
G0007698	Fuse, 60A, Class J	No	3
G0008792	Fuse, 3A, Class CC	No	3
G0003493	Fuse, 15A, Class CC	No	3
G0007225	Fuse, 150A, Class J	No	2
G0007632	Fuse, 225A, Class T	No	3
G0002910	Fuse, 2.5A	No	2
G0002911	Fuse, 7A	No	1
G0002301	Air Filter Element, DX	Yes	1
G0002302	Air Filter Element, BX	Yes	1
G0008005	Door Latch	No	4
G0008349	PLC Battery	Yes	1
G0009286	Intrinsic Barrier, Vibration Switch	No	1
G0007918	Intrinsic Barrier, RTD Sensor	No	1
17244-02	Intrinsic Barrier, Speed Sensor	No	1
Electrical Control Panel - 16607-00			
G0002926	Secondary Fuse, 1.25A	No	1
G0004195	Primary Fuse, 0.5A	No	2
G0009286	Intrinsic Barrier	No	1

TROUBLESHOOTING

Malfunctions due to operating error or other problem can result in unnecessary machine down-time and should be corrected as soon as possible. The troubleshooting procedures presented in this section will assist technicians in isolating and correcting malfunctions.

Troubleshooting Procedure

Fault analysis should proceed logically from the simplest cause to the more complex. The most difficult problem is an unexpected shutdown or inability to start. Always eliminate obvious causes of malfunction before proceeding to more complex possibilities. Since more than one cause may be responsible for a malfunction, the technician must proceed methodically to eliminate all possible causes and take all corrective actions at each step of the troubleshooting process. Where changes to operating procedures are the best course of action, appropriate recommendations are included.

In general, an unexpected centrifuge shutdown is due to an interruption of electric power that has turned off the drive motors. Safety components are installed in key areas of the centrifuge electrical control system to shut down the bowl and conveyor motors if safety parameters such as motor temperature, vibration, or conveyor torque are exceeded. The power interruption may be due to one or more factors, including a local power failure.

TROUBLESHOOTING (CONT'D)

In case of control system malfunction, with electric power shut down, locked out, and tagged out check that PLC connectors are fully seated in their receptacles. Correct as necessary before proceeding with further troubleshooting.

Troubleshooting Chart

The troubleshooting chart consists of failure modes, possible cause(s), and recommended course(s) of action. All electrical continuity checks in this procedure are performed without electric power supplied to the centrifuge. Lock out and tag out equipment before attempting to perform any continuity check.

WARNING! CONTINUITY CHECKS MUST BE PERFORMED WITHOUT ELECTRIC POWER APPLIED TO CENTRIFUGE. LOCK OUT AND TAG OUT ELECTRIC POWER BEFORE ATTEMPTING CONTINUITY CHECKS.

In addition to the troubleshooting information, the technician should refer to the schematic diagrams at the rear of this section and to the appropriate schematic and wiring diagrams in Section 8 and description and theory of operation in Section 1 for additional assistance in troubleshooting.

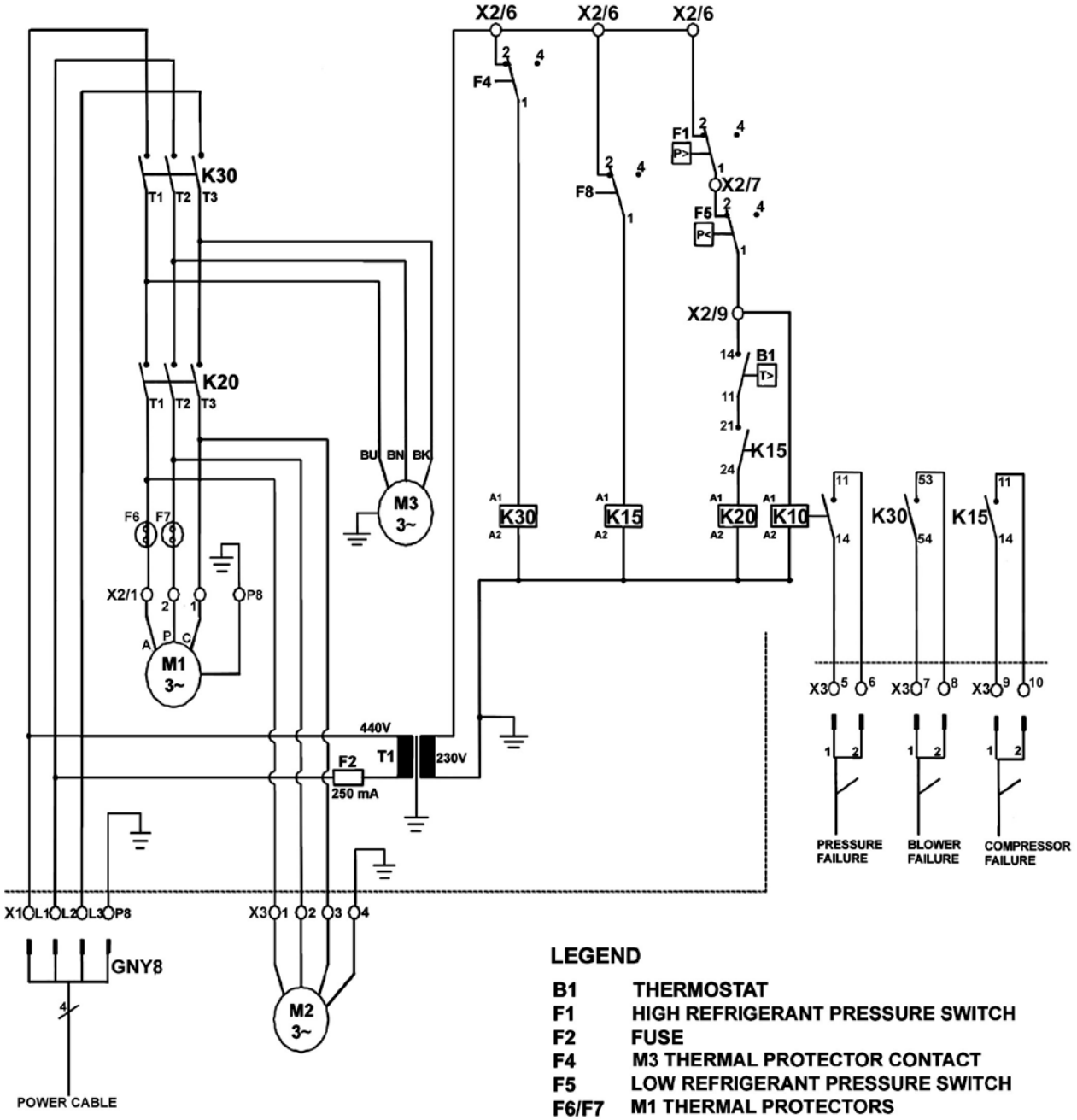
TROUBLESHOOTING DE-7200 VFD CENTRIFUGE	
Possible Cause	**Isolation Procedure & Corrective Action**
Failure Mode 1: Acceptable Liquid, Cake Too Thin	
Insufficient solids in feed	Increase weir opening (refer to Section 4).
	Reduce differential speed.
Drop in feed pump rate	Increase feed rate.
	Check feed pump; if required, check wear and replace worn parts.
	Check pump shaft seal, and correct any defects.
	Select RESET on Fault Reset screen to reset flow rate.
Failure Mode 2: Poor Liquid Quality, Acceptable Cake	
Bowl speed too low	Increase bowl speed.
	Reduce feed rate.
Excessive amount of solids in feed	Reduce quantity of solids in feed or add dilution stream if possible.
Change in feed characteristics	Reduce quantity of solids in feed or generally optimize machines settings, i.e. adjust bowl speed, differential speed, and weir opening.
Conveyor flights worn excessively	Measure clearance through inspection port (Figure 5-9). Replace rotating assembly if excessive wear is found (refer to *Rotating Assembly maintenance*).

TROUBLESHOOTING DE-7200 VFD CENTRIFUGE	
Possible Cause	**Isolation Procedure & Corrective Action**
Failure Mode 3: Excessive Vibration	
Excessive buildup of solids in bowl and/or conveyor.	Perform cleanout procedure (refer to *Preventive Maintenance*).
Bowl assembly main bearings defective.	Replace rotating assembly (refer to *Rotating Assembly Maintenance*).
Bowl assembly unbalanced due to excessive wear or deformed conveyor flights	Inspect conveyor flights through solid discharge openings Replace rotating assembly if excessive flight wear or damage is found.
Failure Mode 4: No Solid Discharge, Untreated Feed Material Exits Liquid Discharge Outlet	
Buildup of solids between flights; solids not being transported to discharge but are discharged with liquid	Shut down feed pump and bowl assembly drive motor, but keep conveyor motor running and admit rinse water into machine. If solids emerge before bowl fully stops, re-start centrifuge.
	Open top cover, and insert hose into liquid and solids discharge openings and flush bowl interior with water (preferably hot water).
	If flushing is unsuccessful in clearing the blockage, replace rotating assembly (refer to *Rotating Assembly Maintenance*).
Failure Mode 5: High Power Consumption, Machine Clogged	
Solids accumulated within case	Open top cover, and thoroughly clean case interior, bowl exterior, and solids discharge chute.
Failure Mode 6: Machine Clogged Upon Starting After a Brief Shutdown	
Excessive solids volume in feed due to sedimentation in supply line	Perform cleanout procedure (refer to *Preventive Maintenance*).
	Prevent future repetition by clearing feed line immediately after shutting down machine.
Failure Mode 7: Machine Shutdown Due to Excessive Power Consumption During Startup	
Discharge chute clogged	Clear discharge chute of all accumulated solids.
Failure Mode 8: Excessively High Main Bearing Temperature	
Insufficient lubrication	Lubricate bearings (refer to *Preventive Maintenance*).
Excessive grease	Remove grease fitting, and direct jet of filtered compressed air to remove grease.
Failure Mode 8: Excessively High Main Bearing Temperature (Cont'd)	
Incorrect grease	Lubricate with recommended grease (refer to *Preventive Maintenance*).
Defective bearings	Replace rotating assembly (refer to *Rotating Assembly Maintenance*).

TROUBLESHOOTING DE-7200 VFD CENTRIFUGE	
Possible Cause	**Isolation Procedure & Corrective Action**
Failure Mode 9: Purge System Purges Correctly, But Alarm Goes On At End Of Purge Interval And Purge Cycle Is Repeated	
Actual cabinet pressure below setting of minimum pressure sensor	Check cabinet for leakage and correct any defects.
Leakage compensation valve setting to low, causing re-purge to occur	Increase cabinet pressure by turning leakage compensation valve adjustment counter-clockwise. Contact Derrick for assistance if problem is not corrected.
Failure Mode 10: Purging Indicator Does Not Become Amber During Purging	
Low air pressure	Check that air supply line is at least 3/4” (12mm). Replace line if undersize.
	Check for stable air pressure of 60-115psi (4-8barg). Raise air pressure if low.
Excessive leakage from cabinet	Check for leakage at cabinet door gasket and at all potential sources of leakage. Maximum permissible leakage is 2.5cfm. Correct as required.
Tube between relief valve and flow sensor not air tight	Check that coupling nuts are tight and tube is undamaged. Correct as required.
Failure Mode 11: Purge System Fails To Turn On Power After Purge Time Has Elapsed	
No power to system	Check and correct power loss.
Main power contactor turned off	Switch on contactor.
Blown fuse	Check and replace fuse(s) if blown.
Incorrect purge time	Check timer setting, and reset to minimum available purge time. Re-check system operation at new setting. If system functions properly, return purge time to original setting. If system fails to close switch, contact Derrick for assistance.
Failure Mode 12: Purge System Relief Valve Remains Open Or Opens Intermittently	
Leakage compensation valve out of adjustment causing high cabinet pressure	Adjust leakage compensation valve by turning adjustment clockwise to reduce pressure.
Debris on relief valve disk, allowing air leakage	Remove relief valve cover, and clean valve disk as required. If necessary to remove disk and spring from relief valve, mark location of disk before removal to ensure proper installation. If cleaning disk fails to eliminate problem, contact Derrick for assistance.

TROUBLESHOOTING DE-7200 VFD CENTRIFUGE	
Possible Cause	**Isolation Procedure & Corrective Action**
Failure Mode 13: Air Conditioner Evaporator Fan Fails to Go On	
Poor electrical connection	Shut down, lock out, and tag out electric power to centrifuge. Open control cabinet door, and locate fan at upper right. Remove eight screws securing fan to air conditioner housing, and separate fan from housing. While supporting fan, check that fan plugs are securely connected and that all leads are secure in connectors. Correct as required; continue troubleshooting if leads are secure.
Fan motor bearings binding or seized	With fan separated from air conditioner housing, unplug and remove fan. Check that fan rotates freely and no rubbing is detected. Replace fan if rubbing or binding is found.
High temperature switch in motor winding defective	Using an ohmmeter, check for continuity across two light gray motor leads of fan connector (Figures 5-10 and 5-13). If meter indicates an open circuit, verify that leads are securely connected; correct as needed. If connections are secure, replace fan.

TROUBLESHOOTING (CONT'D)



LEGEND

B1	THERMOSTAT
F1	HIGH REFRIGERANT PRESSURE SWITCH
F2	FUSE
F4	M3 THERMAL PROTECTOR CONTACT
F5	LOW REFRIGERANT PRESSURE SWITCH
F6/F7	M1 THERMAL PROTECTORS
F8	M1 THERMAL PROTECTOR CONTACTS
K10	FAULT SIGNAL RELAY
K15	M1 THERMAL PROTECTOR RELAY
K20	COMPRESSOR CONTACTOR
K30	POWER CONTACTOR
M1	COMPRESSOR
M2	CONDENSER FAN
M3	EVAPORATOR FAN
T1	CONTROL TRANSFORMER
X1-X3	TERMINAL BOARD

Figure 5-10. Air Conditioner Electrical Schematic Diagram

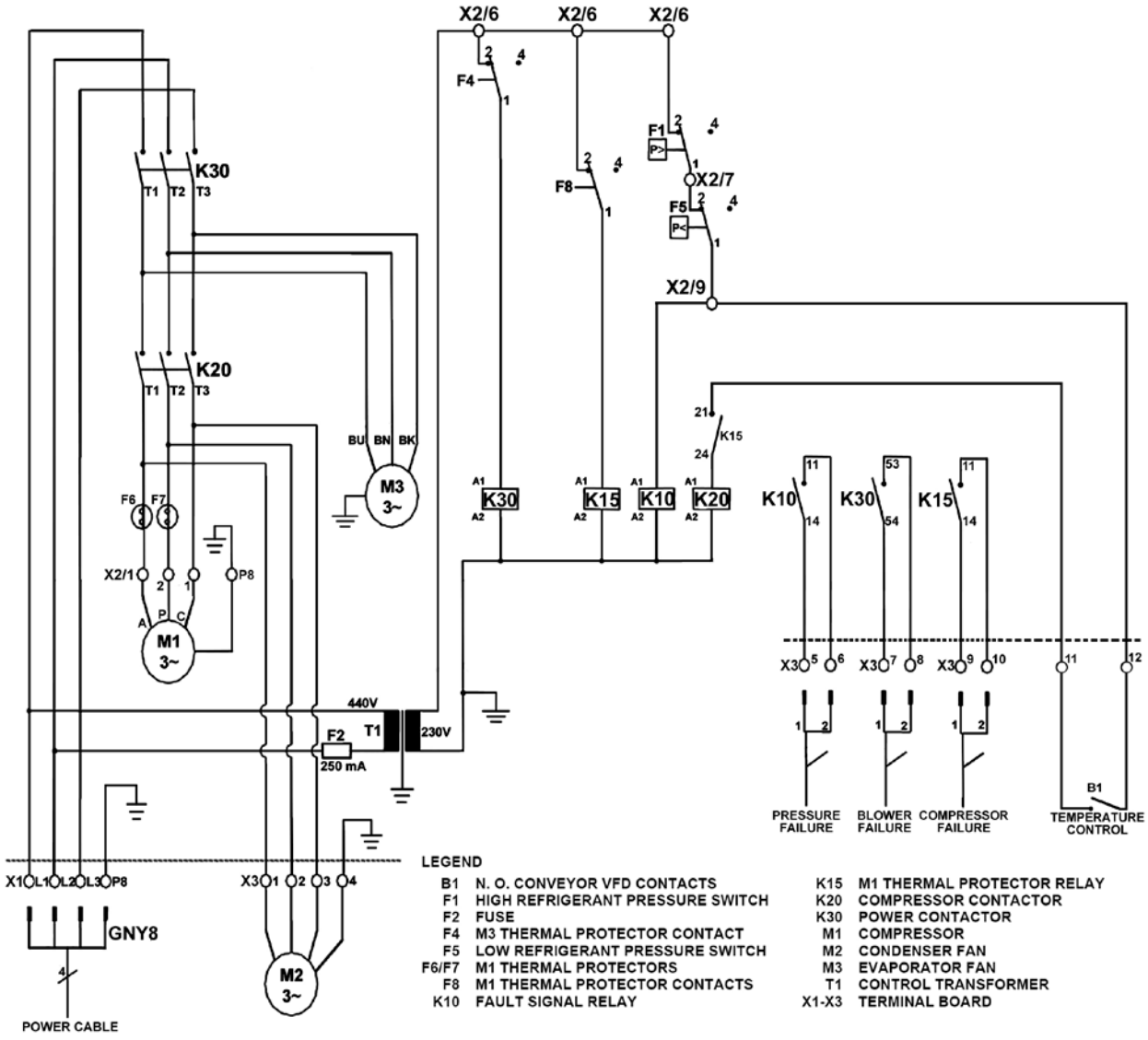


Figure 5-11. Air Conditioner Electrical Schematic Diagram - 230Vac RTD Sensing

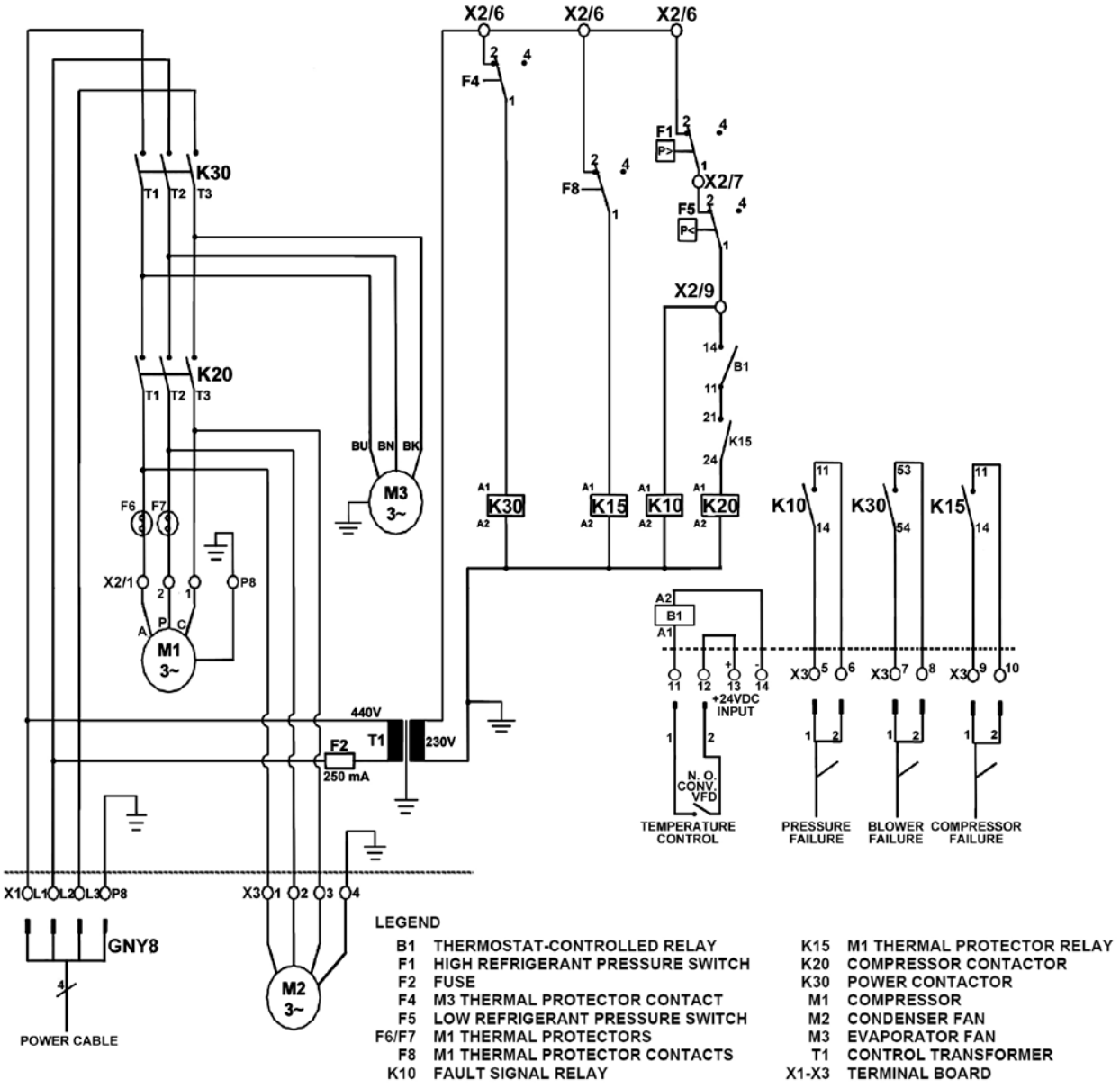


Figure 5-12. Air Conditioner Electrical Schematic Diagram - 24Vdc RTD Sensing

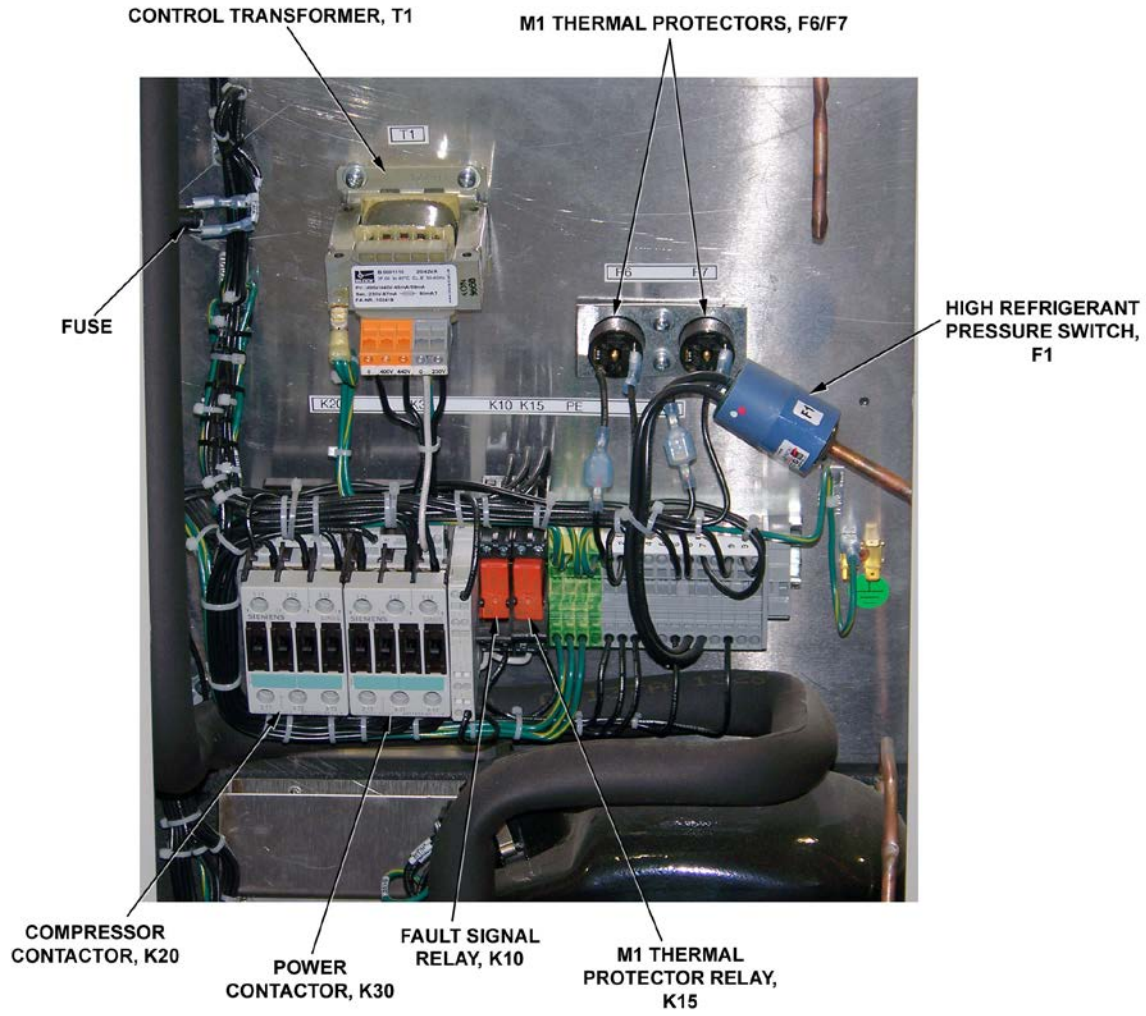


Figure 5-13. Air Conditioner Electrical Components Locations

ALARM AND FAULT MESSAGES

Intervention is required if a control panel message appears to alert the operator that an anomaly has occurred. Alarm messages signify that the prevailing condition must be corrected or the centrifuge may be shut down automatically. Fault messages inform the operator that a failure requiring automatic shutdown has occurred. Refer to the following table for alarm and fault messages and their causes and corrective actions for assistance in analyzing messages.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F1000 - Bowl Exceeded Maximum Speed, Shutdown	
Incorrect or loose connection at speed sensor or defective speed sensor	Check speed sensor connection (refer to Section 3). Replace sensor if defective.
Bowl VFD malfunction	If problem persists, contact Derrick Service for assistance.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F1001 - Bowl High Torque Alarm, Reduce Feed Rate	
Bowl torque exceeds pre-set limit	Reduce feed rate and/or reduce bowl speed.
F1002 - Bowl High Torque Fault and Shutdown, Perform Cleanout and Reduce Feed Rate	
Bowl torque exceeds pre-set limit	After bowl has stopped rotating, perform cleanout procedure to remove solids buildup, and re-start centrifuge at reduced feed rate.
F1010 - Bowl VFD Communications Error	
Communication lost between bowl VFD and PLC	Confirm that green LED next to Ethernet cable on Ethernet switch is lighted, indicating that hub is functional.
	Check connections between bowl VFD and PLC, and correct any defects.
	Replace bowl VFD communication module, if no other defect is found.
F1011 - Bowl VFD Alarm, Ref Troubleshooting Section of User Manual	
Bowl VFD alarm	Identify alarm from operator control panel. Perform indicated corrective action.
F1012 - Bowl VFD Fault and Shutdown, Ref Troubleshooting Section of User Manual	
Bowl VFD fault	Identify fault from operator control panel. Perform indicated corrective action.
F1013 - Bowl VFD Ground Warn Alarm, Ref Troubleshooting Section of User Manual	
Bowl VFD has detected high current leakage to ground	Check condition of cable and all connections between bowl VFD and bowl motor, and correct any defects.
F1014 - Bowl VFD In Phase Loss Alarm, Ref Troubleshooting Section of User Manual	
Bowl VFD has detected unbalance or partial loss of input three-phase power	Check wiring between VFD and supply source; correct defect(s).
	Check supply power, and correct any defects.
F1015 - Bowl VFD Power Loss Alarm, Ref Troubleshooting Section of User Manual	
Incoming power loss or low voltage supply	Check incoming power and correct any defect(s).
F1016 - Bowl VFD Undervoltage Alarm, Ref Troubleshooting Section of User Manual	
Incoming power loss or low voltage supply	Check incoming power and correct any defect(s).

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F1017 - Bowl VFD Drive OL Alarm, Ref Troubleshooting Section of User Manual	
Feed rate causing overload	Reduce feed rate or reduce bowl speed.
Bowl drive motor drawing excessive current	Replace motor if defective.
F1021 - Bowl Motor Thermal Overload Check Bowl Motor Temperature and Thermistor	
Bowl drive motor shut down due to high temperature or defective thermistor in motor winding	Check motor temperature. Allow motor to cool, and then check for continuity across thermistor leads. If open circuit is found, replace motor.
Bad connection(s)	Check connections at TB2-7 and 8, at transmitter/intrinsic barrier, and at conveyor VFD. Correct as required. Replace motor if no defects are found.
F2000 - Conveyor Clutch Tripped, Allow Centrifuge to Stop Completely, then Reset Clutch	
Conveyor torque has exceeded pre-set limit causing clutch to trip	Allow bowl to come to a complete standstill, and then reset clutch as described under Automatic Shutdown in Section 4.
F2001 - Conveyor High Torque Alarm, Reduce Feed Rate	
Conveyor torque exceeds pre-set limit	Reduce feed rate and/or increase differential speed.
F2002 - Conveyor High Torque Fault and Shutdown, Perform Cleanout and Reduce Feed Rate	
Conveyor torque exceeds pre-set limit	After bowl has stopped rotating, perform cleanout procedure to remove solids buildup, and re-start centrifuge at reduced feed rate and/or higher differential speed.
F2010 - Conveyor VFD Communications Error	
Communication lost between conveyor VFD and PLC	Confirm that green LED next to Ethernet cable on Ethernet switch is lighted, indicating that hub is functional.
	Check connections between conveyor VFD and PLC, and correct any defects.
	Replace conveyor VFD communication module, if no other defect is found.
F2011 - Conveyor VFD Alarm, Ref Troubleshooting Section of User Manual	
Conveyor VFD alarm	Identify alarm from operator control panel. Perform indicated corrective action.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F2012 - Conveyor VFD Fault and Shutdown, Ref Troubleshooting Section of User Manual	
Conveyor VFD fault	Identify fault from operator control panel. Perform indicated corrective action.
F2013 - Conveyor VFD Ground Warn Alarm, Ref Troubleshooting Section of User Manual	
Conveyor VFD has detected high current leakage to ground	Check condition of cable and all connections between conveyor VFD and conveyor motor, and correct any defects.
F2014 - Conveyor VFD In Phase Loss Alarm, Ref Troubleshooting Section of User Manual	
Conveyor VFD has detected unbalance or partial loss of input three-phase power	Check wiring between VFD and supply source; correct defect(s).
	Check supply power, and correct any defects.
F2015 - Conveyor VFD Power Loss Alarm, Ref Troubleshooting Section of User Manual	
Incoming power loss or low voltage supply	Check incoming power, and correct any defect(s).
F2016 - Conveyor VFD Undervoltage Alarm, Ref Troubleshooting Section of User Manual	
Incoming power loss or low voltage supply	Check incoming power, and correct any defect(s).
F2021 - Conveyor Motor Thermal Overload Check Conveyor Motor Temperature and Thermistor	
Conveyor drive motor shut down due to high temperature or defective thermistor in motor winding	Check motor temperature. Allow motor to cool, and then check for continuity across thermistor leads. If open circuit is found, replace motor.
Bad connection(s)	Check connections at TB2-5 and 6, at transmitter/intrinsic barrier, and at conveyor VFD. Correct as required. Replace motor if no defects are found.
F3001 - Pump Shutdown or Will Not Start Due to Dry Run Protection Alarm	
Low tank level	Check and re-fill feed tank sufficiently to close low level switch.
F3002 - Flow Meter Flow Detection Error, Feed Pump has Shutdown	
Insufficient pump output detected	Check and re-fill feed tank sufficiently. Verify that control valves (if any) are open to allow material to flow.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F3010 - Pump VFD Communications Error	
Communication lost between pump VFD and PLC	Confirm that green LED next to Ethernet cable on Ethernet switch is lighted, indicating that hub is functional.
	Check connections between pump VFD and PLC, and correct any defects.
	Replace pump VFD, if no other defect is found.
F3011 - Pump VFD Alarm, Ref Troubleshooting Section of User Manual	
Pump VFD alarm	Identify alarm from operator control panel. Perform indicated corrective action.
F3012 - Pump VFD Fault, Ref Troubleshooting Section of User Manual	
Pump VFD fault	Identify fault from operator control panel. Perform indicated corrective action.
F3013 - Pump VFD Ground Warn Alarm, Ref Troubleshooting Section of User Manual	
Pump VFD has detected high current leakage to ground	Check condition of cable and all connections between pump VFD and pump motor, and correct any defects.
F3014 - Pump VFD In Phase Loss Alarm, Ref Troubleshooting Section of User Manual	
Pump VFD has detected unbalance or partial loss of input three-phase power	Check wiring between VFD and supply source; correct defect(s).
	Check supply power, and correct any defects.
F3015 - Pump VFD Power Loss Alarm, Ref Troubleshooting Section of User Manual	
Incoming power loss or low voltage supply	Check incoming power and correct any defect(s).
F3016 - Pump VFD Undervoltage Alarm, Ref Troubleshooting Section of User Manual	
Incoming power loss or low voltage supply	Check incoming power and correct any defect(s).
F3017 - Pump VFD Drive OL Alarm, Ref Troubleshooting Section of User Manual	
Pump drive motor drawing excessive current	Replace motor, if defective, or remove other cause of excessive current draw. Perform autotune of pump motor/drive.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F3021 - Pump Motor Thermal Overload Check Pump Motor Temperature and Thermistor	
Pump drive motor shut down due to high temperature or defective thermistor in motor winding	Check motor temperature. Allow motor to cool, and then check for continuity across thermistor leads. If open circuit is found, replace motor.
Bad connection(s)	Check connections at TB2-3 and 4, at transmitter/intrinsic barrier, and at pump VFD. Correct as required. Replace motor if no defects are found.
F3022 - Pump Bearing/Stator Thermal Overload Check Pump Bearing Temperature and Stator	
Pump drive motor shut down due to high bearing temperature or high temperature in stator winding	Check motor bearing temperature. Allow motor to cool, and then check for continuity across stator thermistor leads. If open circuit is found, replace motor.
Bad connection(s)	Check connections at TB2-3 and 4, at transmitter/intrinsic barrier, and at pump VFD. Correct as required. Replace motor if no defects are found.
F3030 - Pump Motor FLA Download to VFD Failed	
Pump motor FLA download was not successfully completed	Repeat pump motor data download procedure. Verify that pump drive is on line and stopped.
F3031 - Pump Motor Power Download to VFD Failed	
Pump motor power download was not successfully completed	Repeat pump motor data download procedure. Verify that pump drive is on line and stopped.
F3032 - Pump Motor Power Units Download to VFD Failed	
Pump motor power units download was not successfully completed	Repeat pump motor data download procedure. Verify that pump drive is on line and stopped.
F4001 - Centrifuge Start Disable - Allow Bowl to Stop Completely, View Alarm History for Additional Fault Conditions	
Restart aborted due to bowl rotation during restart attempt	Wait for bowl to fully stop, check for and clear all faults, and verify that bowl is at complete standstill. Restart centrifuge.
F4002 - Clean Out Over Torque Fault	
Excessive torque has caused clean out procedure to abort	Attempt to clear using Manual Cleanout procedure in this section. If unsuccessful, connect a liquid supply line to flush fitting to dilute process material, and re-attempt Manual Cleanout. If still unsuccessful, with bowl at complete standstill, open cover and remove excessive process material.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F4003 - Liquid End Main Bearing High Temperature Alarm	
Incorrect or loose connection at temperature sensor	If reading is constantly about 392°F (200°C), check and correct connection (refer to Section 3 and electrical schematic diagram in Section 8).
Insufficient bearing lubrication	Lubricate bearings (refer to *Preventive Maintenance*).
Excess grease	Remove grease fitting, and direct jet of filtered compressed air into opening to remove grease.
Incorrect grease	Lubricate with recommended grease (refer to *Preventive Maintenance*).
Defective bearing	Contact Derrick Service department for assistance.
F4004 - Liquid End Main Bearing High Temperature Fault and Shutdown	
Insufficient bearing lubrication	Lubricate bearings (refer to *Preventive Maintenance*).
Excess grease	Remove grease fitting, and direct jet of filtered compressed air into opening to remove grease.
Incorrect grease	Lubricate with recommended grease (refer to *Preventive Maintenance*).
Defective bearing	Contact Derrick Service department for assistance.
F4005 - Solid End Main Bearing High Temperature Alarm	
Incorrect or loose connection at temperature sensor	If reading is constantly about 392°F (200°C), check and correct connection (refer to electrical schematic diagram in Section 8).
Insufficient bearing lubrication	Lubricate bearings (refer to *Preventive Maintenance*).
Excess grease	Remove grease fitting, and direct jet of filtered compressed air into opening to remove grease.
Incorrect grease	Lubricate with recommended grease (refer to *Preventive Maintenance*).
Defective bearing	Replace rotating assembly (refer to *Rotating Assembly Maintenance*).

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F4006 - Solid End Main Bearing High Temperature Fault and Shutdown	
Insufficient bearing lubrication	Lubricate bearings (refer to *Preventive Maintenance*).
Excess grease	Remove grease fitting, and direct jet of filtered compressed air into opening to remove grease.
Incorrect grease	Lubricate with recommended grease (refer to *Preventive Maintenance*).
Defective bearing	Contact Derrick Service department for assistance.
F7011 - Air Conditioner Compressor Motor Overload Fault	
Motor drawing excessive current	Confirm proper operation of relays K20 and K30 and adequacy of three-phase power supply. Check all electrical connections. Correct any defects.
F7012 - Air Conditioner Internal Fan Motor Overload Fault	
Motor drawing excessive current	Confirm proper operation of relays K20 and K30 and adequacy of three-phase power supply. Check all electrical connections. Correct any defects.
F7013 - Air Conditioner Refrigerant Pressure High or Low Fault	
Refrigerant pressure high or low	Attempt to re-start centrifuge. Low pressure will cause immediate shutdown or failure to start; high pressure will permit brief operation and then automatic shutdown. If low pressure indicated, contact Derrick Service for assistance. If high pressure indicated, continue troubleshooting.
Condenser motor rotation incorrect or motor defective	Check rotation direction, and reverse, if necessary, by switching two leads.
Condenser cooling fins clogged	Use vacuum cleaner to remove all debris from fins.
Condenser motor defective	Check motor, and replace if defective. If problem persists, contact Derrick Service for assistance.
F7021 - Electrical Enclosure High Temperature Alarm	
Control cabinet interior temperature has exceeded alarm setpoint	Check status/operation of air conditioner; repair or replace if defective.
	Reduce load by decreasing bowl, conveyor differential speed, and/or pump feed rate.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F7022 - Electrical Enclosure High Temperature Fault and Shutdown	
Control cabinet interior temperature has exceeded alarm setpoint	Check status/operation of air conditioner; repair or replace if defective.
	Reduce load by decreasing bowl, conveyor differential speed, and/or pump feed rate.
Interior temperature of control cabinet too high, causing shutdown	Check that air conditioner is operating; repair or replace, as indicated. Inspect cabinet interior, and remove cause of high temperature, if any. Re-start centrifuge after removing cause of high temperature.
F7031 - Enclosure Temperature Sensor Error	
Control cabinet interior temperature sensor not functioning	Check sensor and connection. Correct any wiring defects, and replace sensor if defective.
F8001 - Emergency Stop Switch Activated, Shutdown	
EMERGENCY STOP initiated	Remove cause for emergency stop, pull out EMERGENCY STOP, and then re-start centrifuge.
F8002 - Emergency Stop Switch or Belt Guard Sensor Trip	
EMERGENCY STOP initiated or belt guard removed or not secure	Check and secure belt guard, pull out EMERGENCY STOP, and then re-start centrifuge.
F8003 - High Vibration Fault and Shutdown, Correct Problem and Press Reset Button	
Rotating assembly unbalanced or mechanical looseness	Rotating assembly overloaded or clogged, bearing failure, conveyor wear, or loose pillow block bolts producing out-of-balance condition. Remove cause of excessive vibration and re-start centrifuge.
F8004 - High Vibration Switch or Bowl Cover Sensor Trip	
Case cover not secure	Check and secure cover, and re-start centrifuge.
Rotating assembly unbalanced or mechanical looseness	Rotating assembly overloaded or clogged, bearing failure, conveyor wear, or loose pillow block bolts producing out-of-balance condition. Remove cause of excessive vibration and re-start centrifuge.
F9010 - Control Program Downloaded from Memory Card to Controller	
Re-loading of PLC program from memory card completed	Start centrifuge, and resume operation.
F9011 - Controller Internal Battery Low, Replace	
PLC battery low	Replace battery.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F9012 - External Communication Loss, Switched to Local Control	
Profibus not working, remote control is disabled and control has automatically switched to local	Check and correct any defects in Profibus connections, and attempt to re-start in Remote operating mode.
F9021 - Signal Loss - Bowl Speed Sensor Intrinsic Barrier	
Minimum analog signal from transmitter/intrinsic barrier not received by PLC	Check all connections at transmitter/intrinsic barrier; replace transmitter if all connections are secure.
F9022 - Signal Loss - Bowl Speed Sensor or Cable	
Incorrect or loose connection at speed sensor or defective speed sensor	Check sensor connections; replace sensor if defective.
Defective speed sensor transmitter/intrinsic barrier	Check and replace transmitter/intrinsic barrier, if defective.
Pump VFD fault	Identify fault from operator control panel. Perform indicated corrective action.
F9031 - Signal Loss - Clutch Speed Sensor Intrinsic Barrier	
Minimum analog signal from transmitter/intrinsic barrier not received by PLC	Check all connections at transmitter/intrinsic barrier; replace transmitter if all connections are secure.
F9032 - Signal Loss - Bowl Speed Sensor or Cable	
Incorrect or loose connection at speed sensor or defective speed sensor	Check sensor connections; replace sensor if defective.
Defective speed sensor transmitter/intrinsic barrier	Check and replace transmitter/intrinsic barrier, if defective.
Pump VFD fault	Identify fault from operator control panel. Perform indicated corrective action.
F9041 - Signal Loss - Liquid End Bearing Temp Intrinsic Barrier	
Minimum analog signal from transmitter/intrinsic barrier not received by PLC	Check all connections at transmitter/intrinsic barrier; replace transmitter if all connections are secure.
F9051 - Signal Loss - Solid End Bearing Temp Intrinsic Barrier	
Minimum analog signal from transmitter/intrinsic barrier not received by PLC	Check all connections at transmitter/intrinsic barrier; replace transmitter if all connections are secure.

ALARM AND FAULT MESSAGES	
Cause	**Corrective Action**
F9099 - Centrifuge Sensor I/O Cable Has Been Removed, Reconnect I/O Cable to Run Centrifuge	
Sensor cable is disconnected from control cabinet receptacle	Plug in connector at upper left of cabinet, and then re-start centrifuge.

VFD ALARM AND FAULT CROSS REFERENCES

In addition to alarm and fault messages that may appear on the operator control panel, in case of equipment malfunction alarm and fault numbers may appear directly on the VFD screens. An alarm is a condition that, if neglected, may stop the drive. A fault is a condition that stops the drive.

The following tables list these alarm and fault numbers and the corresponding text. This information is useful for operators and Derrick personnel to diagnose equipment malfunctions. To expedite troubleshooting, record the code number before calling for service and then relay this information to the service engineer.

ALARM CROSS REFERENCE					
No.	**Alarm**	**No.**	**Alarm**	**No.**	**Alarm**
1	Precharge Active	14	Load Loss	27	Speed Ref Cflct
2	UnderVoltage	15	Ground Warn	28	Ixo Vlt Rang
3	Power Loss	17	Dig In ConflictA	29	Sleep Config
4	Start At PowerUp	18	Dig In ConflictB	30	TB Man Ref Cflct
5	Analog In Loss	19	Dig In ConflictC	31	PTC Conflict
6	IntDBRes OvrHeat	20	BiPolar Conflict	32	Brake Slipped
8	Drive OL Level 1	21	Motor Type Cflct	33	AdjVoltRef Cflct
9	Drive OL Level 1	22	NP Hz Conflict	34	Home Not Set
10	Decel Inhibt	23	MaxFreq Conflict	49	Torq Prove Cflct
11	Waking	24	VHz Neg Slope	50	Prof Step Cflct
12	Motor Thermistor	25	IR Volts Range	52	PI Config Cflct
13	In Phase Loss	26	FluxAmpsRef Rang		

FAULT CROSS REFERENCE					
No.	**Fault**	**No.**	**Fault**	**No.**	**Fault**
2	Auxiliary Input	38	Phase U to Grnd	81-85	Port 1-5 DPI Loss
3	Power Loss	39	Phase V to Grnd	87	IXo VoltageRange
4	UnderVoltage	40	Phase W to Grnd	88	Software Fault
5	OverVoltage	41	Phase UV Short	89	Software Fault
7	Motor Overload	42	Phase VW Short	90	Encoder Quad Err
8	Heatsink OvrTemp	43	Phase UW Short	91	Encoder Loss
9	Trnsistr OvrTemp	48	Params Defaulted	92	Pulse In Loss
12	HW OverCurrent	49	Drive Powerup	93	Hardware Fault
13	Ground Fault	51	Flt QueueCleared	100	Parameter Chksum
15	Load Loss	52	Faults Cleared	101-103	UserSet Chksum
16	Motor Thermistor	55	Cntl Bd Overtemp	104	Pwr Brd Chksum1
17	Input Phase Loss	63	Shear Pin	105	Pwr Brd Chksum2
20	TorqProv Spd Band	64	Drive OverLoad	106	Incompat MCB-PB
21	Output PhaseLoss	69	DP Resistance	107	Replaced MCB-PB
24	Decel Inhibit	70	Power Unit	108	Anlg Cal Chksum
25	OverSpeed Limit	71-75	Port 1-5 Adapter	120	I/O Mismatch
28	See Manual	77	IR Volts Range	121	I/O Comm Loss
29	Analog In Loss	78	FluxAmpsRef Rang	122	I/O Failure
33	Auto Rstrt Tries	79	Excessive Load	130	Hardware Fault
36	SW OverCurrent	80	AutoTune Aborted	131	Hardware Fault

CONTROL COMPONENT INDICATORS

Various indicators are provided to display the operational status of components in the control cabinet. Figures 5-14 through 5-17 locate and define the indications shown on these components. Where applicable, corrective actions are included to assist the operator in fault analysis.

Dangerously high voltage is present in the control cabinet. Since opening the control cabinet door and bypassing the cabinet purge system is required to check the indicators, only trained, qualified personnel should be permitted to perform these procedures. Use extreme caution to ensure that the surrounding atmosphere is free of hazardous fumes before opening the cabinet door and bypassing the purge system.

HIGH VOLTAGE! ONLY TRAINED, QUALIFIED PERSONNEL SHOULD BE PERMITTED TO OPEN CONTROL CABINET DOOR WHILE POWER IS APPLIED.

EXPLOSION HAZARD! BE CERTAIN THAT SURROUNDING ATMOSPHERE IS CLEAR OF ALL POTENTIALLY EXPLOSIVE GASES BEFORE OPENING CONTROL CABINET DOOR.

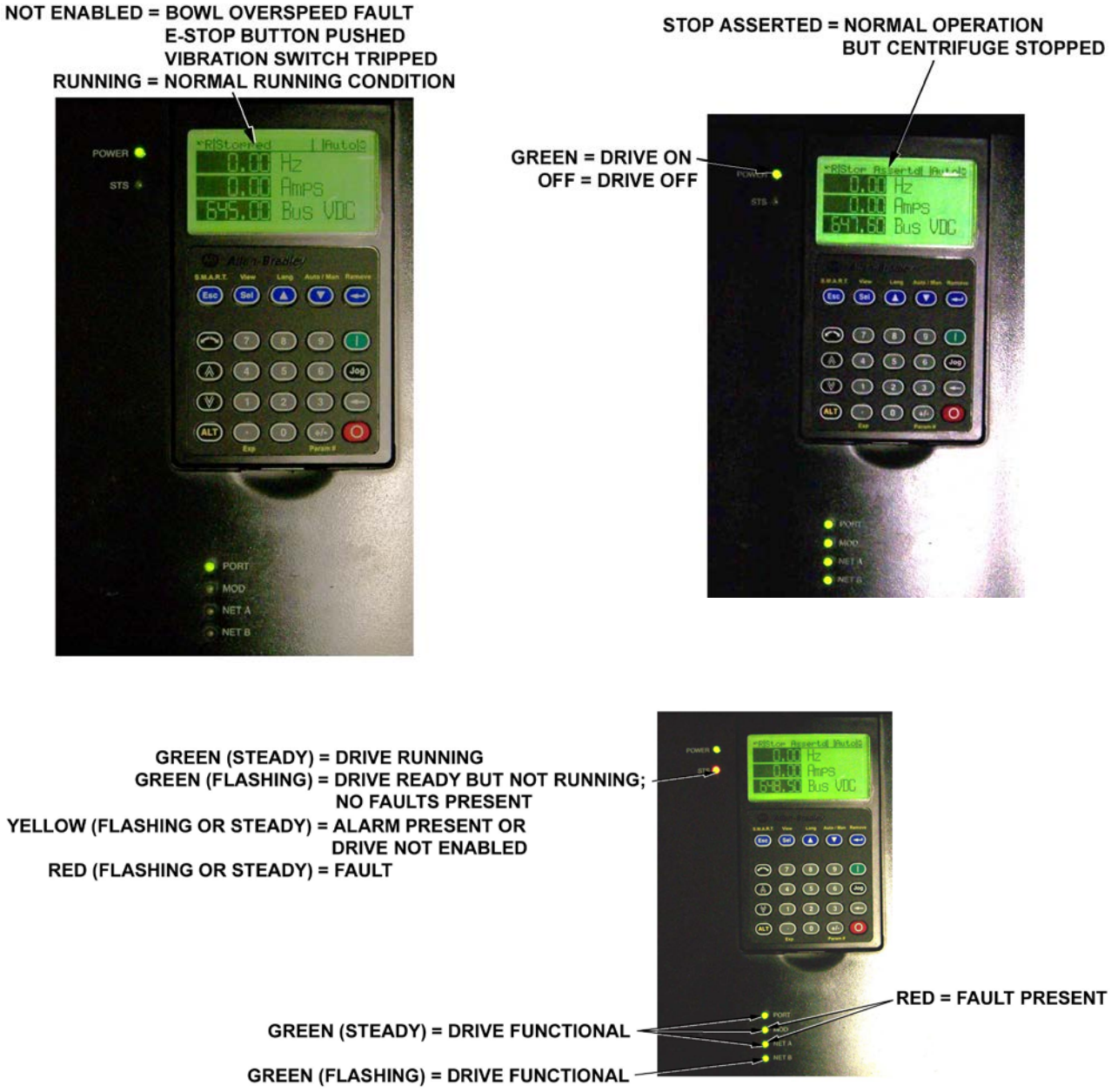
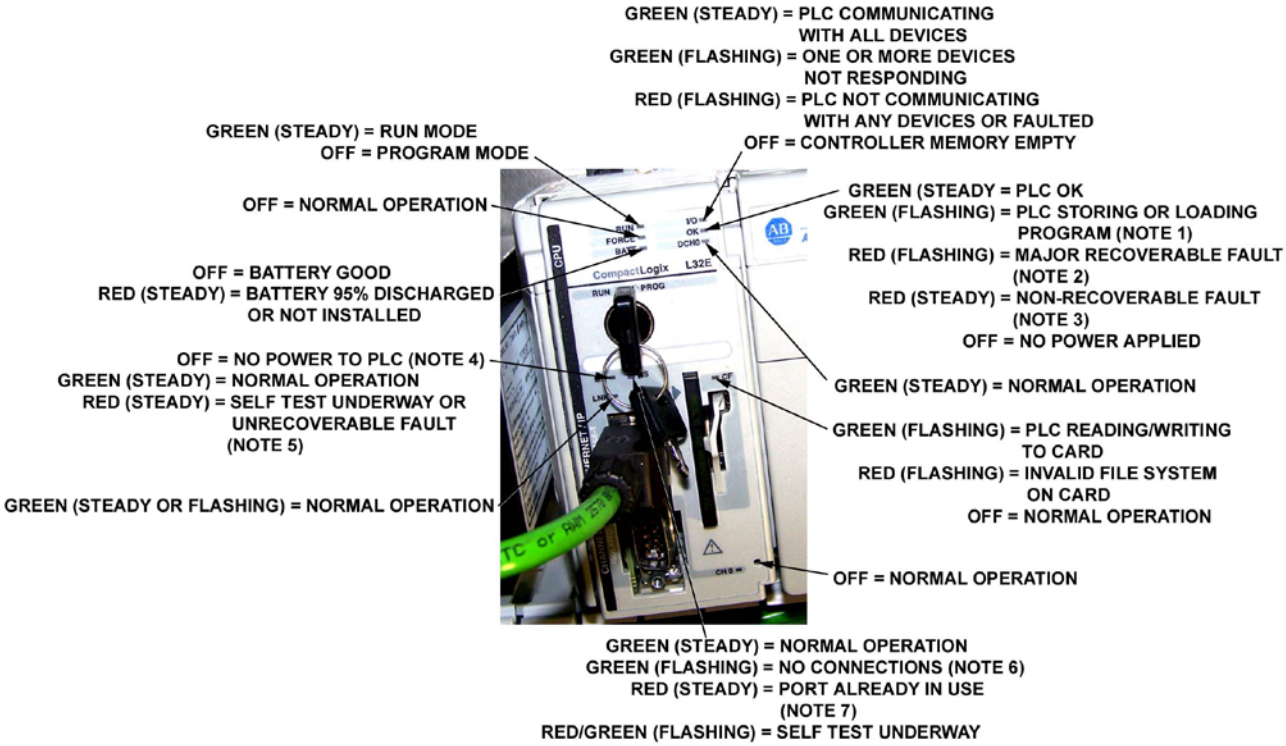


Figure 5-14. VFD Indicators



NOTES:
1. WAIT FOR MEMORY LOAD TO COMPLETE.
2. TURN PLC KEY SWITCH FROM "PROG" TO "RUN" AND THEN BACK TO "REM"; THEN CYCLE POWER OFF AND ON.
3. CYCLE POWER OFF AND ON.
4. CHECK PLC POWER SUPPLY.
5. CYCLE POWER OFF AND ON. IF PROBLEM FAILS TO CLEAR, REPLACE PLC.
6. CHECK DRIVE CONNECTIONS AND DRIVES.
7. TWO CENTRIFUGES CONNECTED TOGETHER (NETWORKED). MACHINES MUST BE SEPARATE.

Figure 5-15. PLC Indicators

CONTROL COMPONENT INDICATORS (CONT'D)

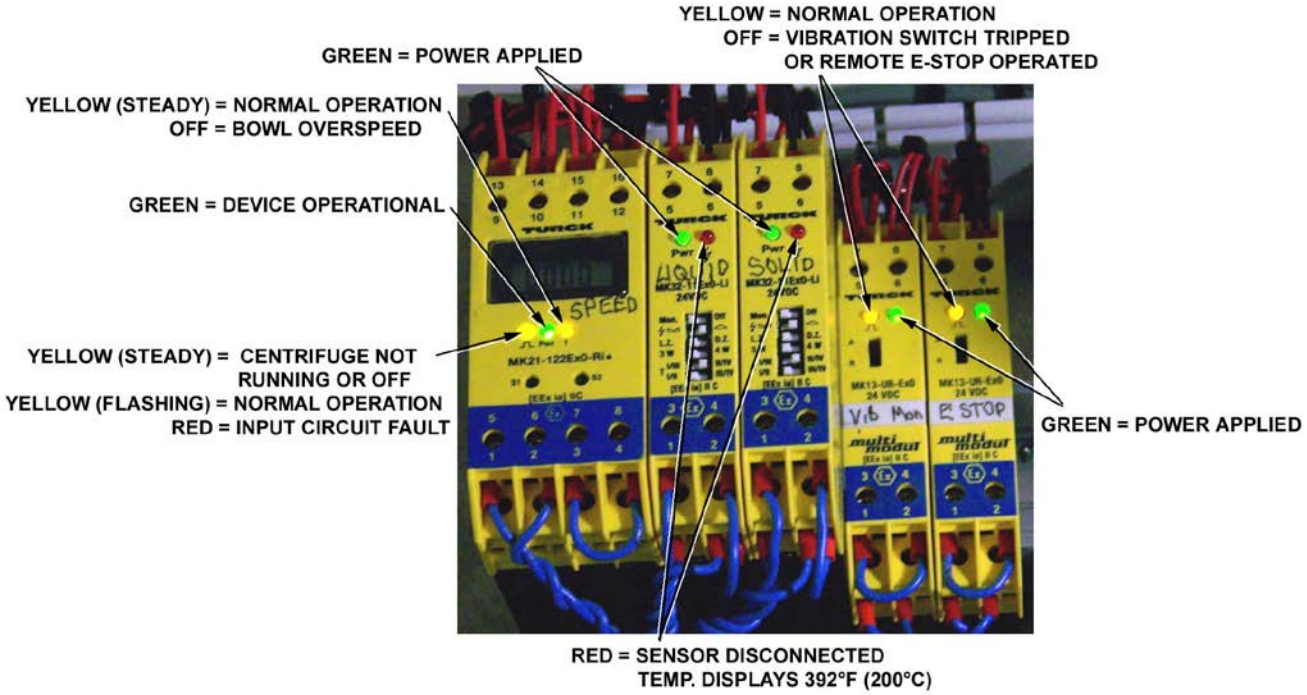


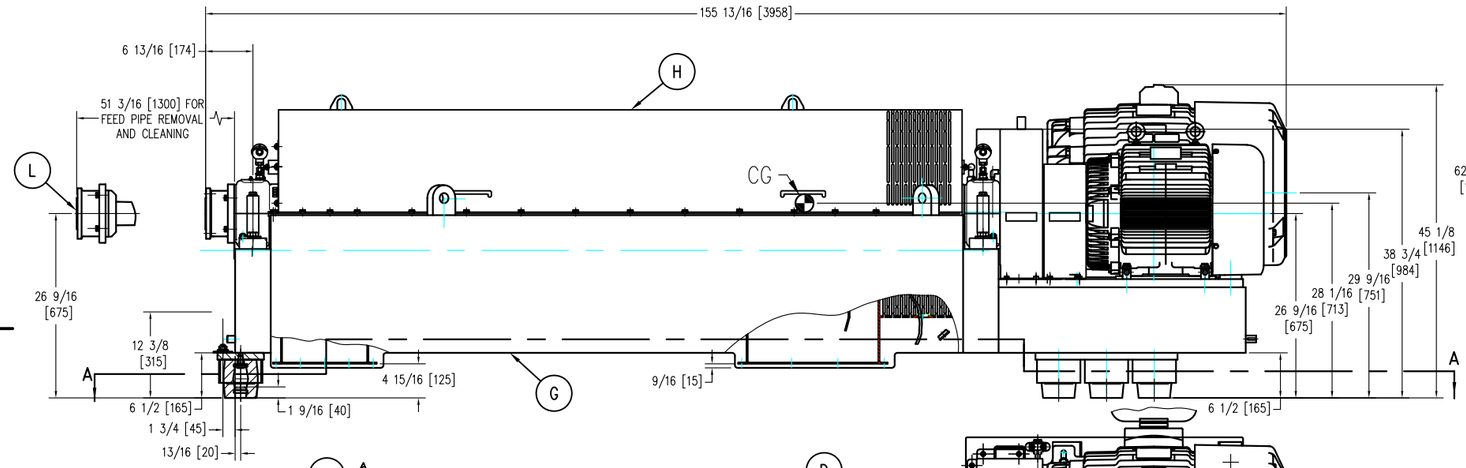
Figure 5-16. Transmitter/Intrinsic Barrier Indicators

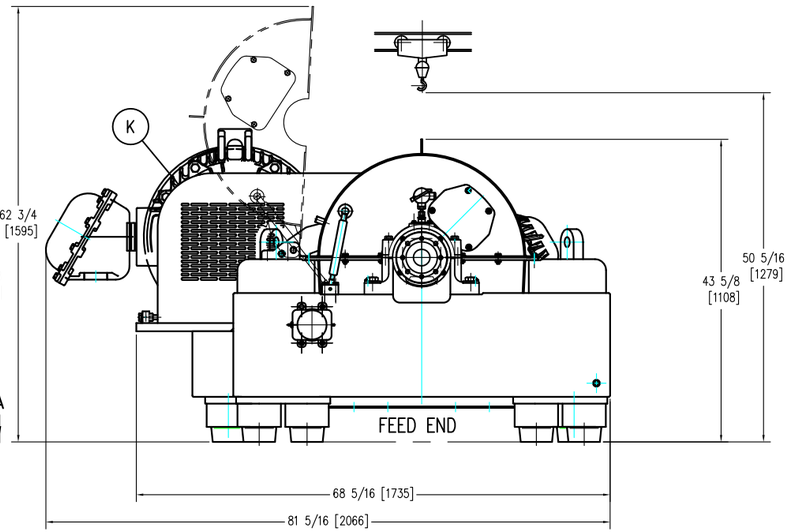
Figure 5-17. Power Supply Indicators

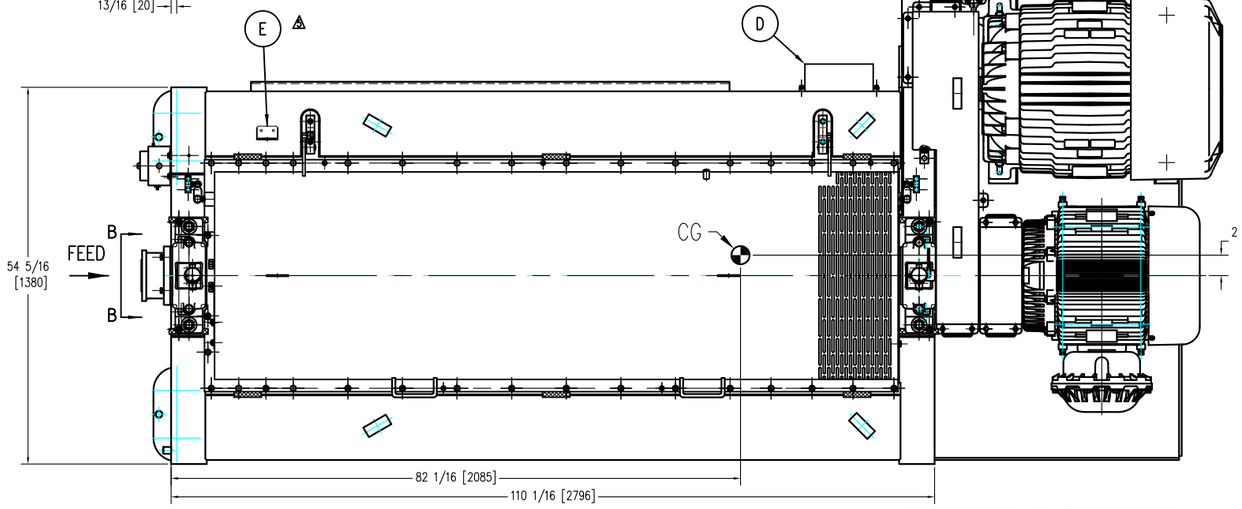
SECTION 8 - REFERENCE DRAWINGS

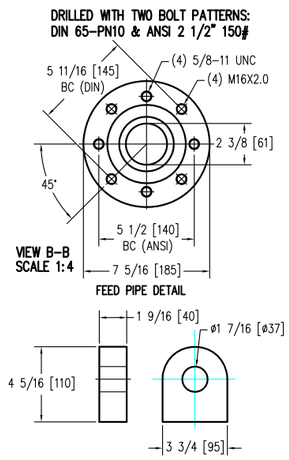
This section contains Derrick engineering drawings for your equipment. These drawings are included to provide assistance in troubleshooting, repair, and parts ordering.

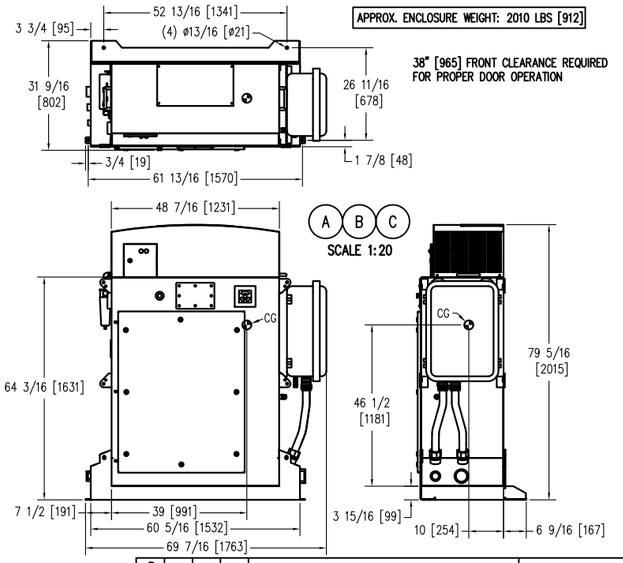
Number	Title
16590-00-003	General Arrangement - XP Centrifuge
16590-00-004	General Arrangement - Non-XP Centrifuge
16601-00-001	Base Parts List
16602-00-001	Case and Cover Parts List
16603-00-001	Bowl Parts List
16604-00-001	Conveyor Parts List
16605-00-001	Belt Guard Parts List
14394-00-007	Electrical Wiring Schematic - 460/480V 60 Hz Non-XP Centrifuge
14394-00-009	Electrical Wiring Schematic - 460/480V 60 Hz XP Centrifuge
14394-00-011	Electrical Wiring Schematic - 380/400V 50Hz XP Centrifuge
14394-00-012	Electrical Wiring Schematic - 575/600V 60 Hz XP Centrifuge
14394-00-013	Electrical Wiring Schematic - 380/400V 50Hz Non-XP Centrifuge
16606-00-001	Feed Component Assembly
16618-00	Junction Box Assembly
16621-00	Drive Components Parts List
16593-00-002	Base Sensor System Parts List
16798-00	Repair Tool Kit
16607-00	XP Electrical Control Panel
16472-00-002	Control Enclosure Assembly, 460/480V 60 Hz XP Centrifuge
16472-00-003	Control Enclosure Assembly, 380/400V 50 Hz XP Centrifuge
16472-00-004	Control Enclosure Assembly, 575/600V 60 Hz XP Centrifuge
16472-00-005	Control Enclosure Assembly, 460/480V 60Hz Non XP Centrifuge





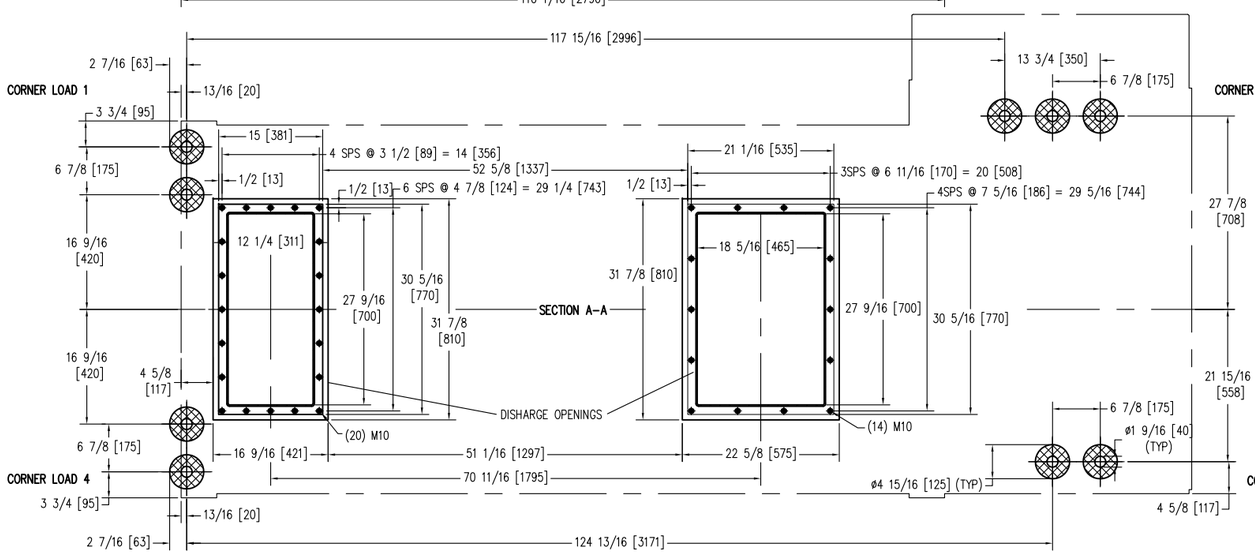






APPROX. ENCLOSURE WEIGHT: 2010 LBS [912]

38" [965] FRONT CLEARANCE REQUIRED FOR PROPER DOOR OPERATION



OPERATION SPEED : 2500-3200 RPM	CORNER LOAD NO.	STATIC LOAD INCL. BOWL CHARGE [LBS]	DYNAMIC LOAD [LBS] IN VERTICAL DIRECTION OPERATING SPEED	IN VERTICAL DIRECTION WHEN PASSING RESONANCE	IN HORIZONTAL DIRECTION OPERATING SPEED	IN HORIZONTAL DIRECTION WHEN PASSING RESONANCE
THE STIFFNESS OF THE SUPPORT STRUCTURE SHOULD BE ADJUSTED SO THAT THE NATURAL FREQUENCY OF THAT STRUCTURE WITH MACHINE IS 30% ABOVE THE FREQUENCY AT THE OPERATING SPEED	1	2529	126	760	52	254
	2	5755	288	1727	115	576
	3	3012	151	904	61	301
	4	2529	126	760	52	254

RECOMMENDED MAINTENANCE AND ACCESS SPACE-
FRONT- 2-3 FEET [1 METER]
SIDES- 2-3 FEET [1 METER]
REAR- 2-3 FEET [1 METER]

DIMENSIONS IN [ ] = MM/KG

APPROX. MACH. WEIGHT: 14000 LBS [6350]

REFERENCE DRAWINGS	
WIRING DIAGRAM (460/480/60)	14394-00-009
WIRING DIAGRAM (380/400/50)	14394-00-011
WIRING DIAGRAM (575/600/60)	14394-00-012
LUBRICATION & MAINTENANCE	16660-00

NOTE:
G0012054 - COMPLETE ROTATING ASSEMBLY
UNITS CF005059 - CURRENT

ITEM	QTY			DESCRIPTION	PARTS LIST
P					
O					
N					
M	1	1	1	MOTORS AND MECHANICAL DRIVE COMPONENTS	16621-00-001
L	1	1	1	FEED TUBE ASSEMBLY	16606-00-001
K	1	1	1	BELT GUARD	16605-00-001
J	1	1	1	CONVEYOR	16604-00-001
I	1	1	1	BOWL	16603-00-001
H	1	1	1	CASE & COVER	16602-00-002
G	1	1	1	BASE	16601-00-002
F					
E	1	1	1	COVER LOCKING PIN & BRACKET ASSEMBLY	18059-08
D	1	1	1	ELECTRICAL PARTS LIST	16593-00-002
C	1			CONTROL ENCLOSURE (575/600/60)	16472-00-004
B		1		CONTROL ENCLOSURE (380/400/50)	16472-00-003
A			1	CONTROL ENCLOSURE (460/480/60)	16472-00-002
03	X			CENTRIFUGE ASSEMBLY (575/600/60)	16590-03-003
02		X		CENTRIFUGE ASSEMBLY (380/400/50)	16590-02-003
01			X	CENTRIFUGE ASSEMBLY (460/480/60)	16590-01-003

REV	CHANGE	CHD	DATE
5	ADDED ITEM E	PD CCS	09/11/13
4	ADDED LIFTING LUG DETAIL.	MB	11/9/12
3	MODIFIED DRAWING NUMBERS IN BOM, ITEM D WAS 15593-00, ITEM G WAS 16601-00-001, ITEM H WAS 16602-00-001 AND ITEM M WAS 16621-00.	MB	8/20/12
2	REMOVED 16473-00 AND 16674-00 FROM REFERENCE DRAWINGS LIST, REMOVED ITEMS EMF (THERE EPL'S FOR 575V AND 380V), RENAMED ITEM DWNS ELECTRICAL PARTS LIST 460V.	MB	3/5/12
1	REMOVED ITEM L (BELT GUARD ASSEMBLY) ADDED ITEM M (MOTOR & DRIVE COMPONENTS), RENAMED ITEM N (WAS MOTOR, BOWL DRIVE), REMOVED ITEM O (WAS MOTOR CONVEYOR DRIVE), REMOVED ITEM P (WAS GEAR UNIT), ADDED PARTS LIST NUMBERS TO ITEMS J, K, L, AND M, ADDED WTY TO TITLE, ADDED UNIT NUMBERS TO NOTE.	MB	12/6/11
	ADDED NOTE, ITEM G WAS 16602-00, ITEM H WAS 16602-00, ITEM I WAS 16603-00, ITEM J WAS 16604-00, ITEM K WAS 16605-00	CHD	DATE

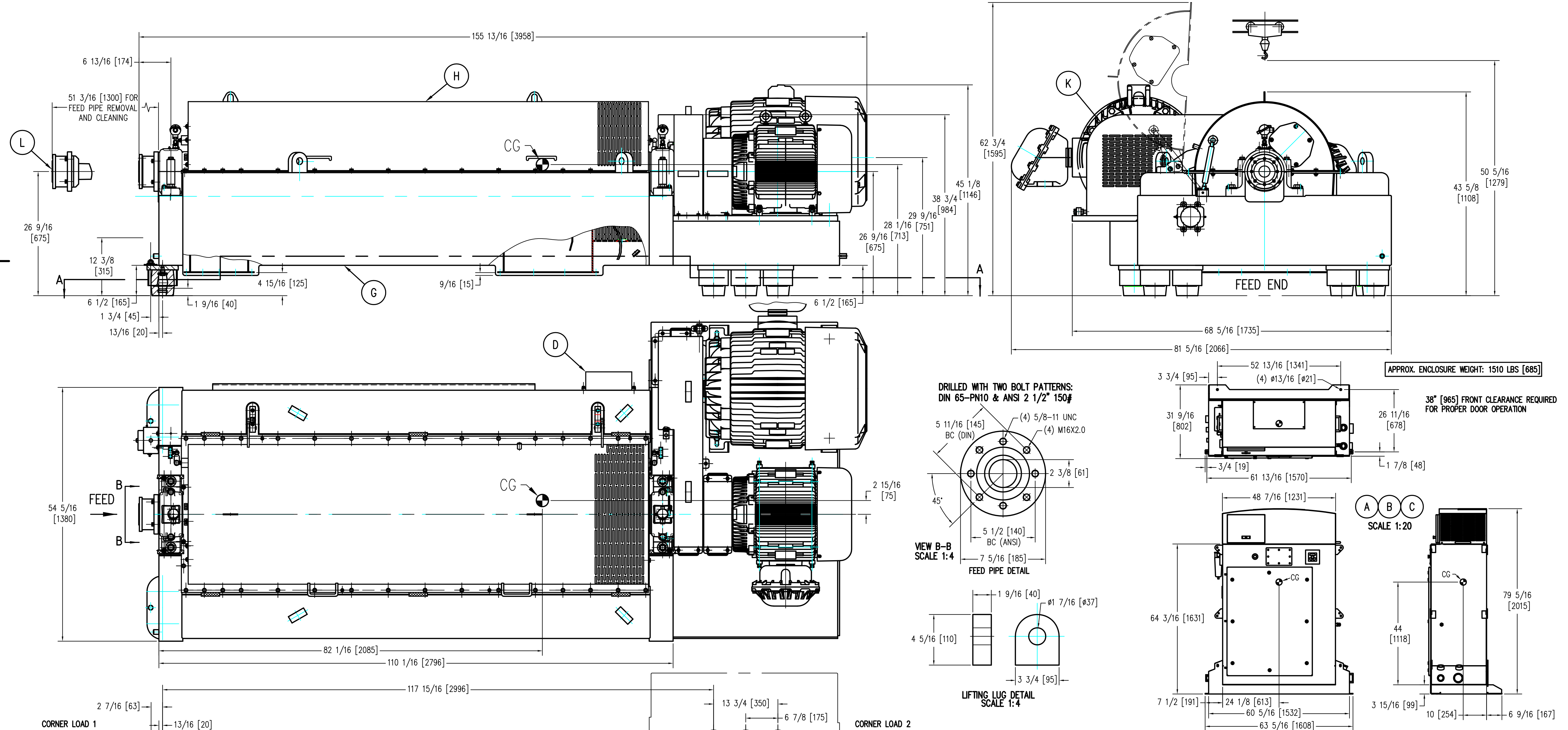
CENTRIFUGE GENERAL ARRANGEMENT
DE-7200 VFD EX-PROOF

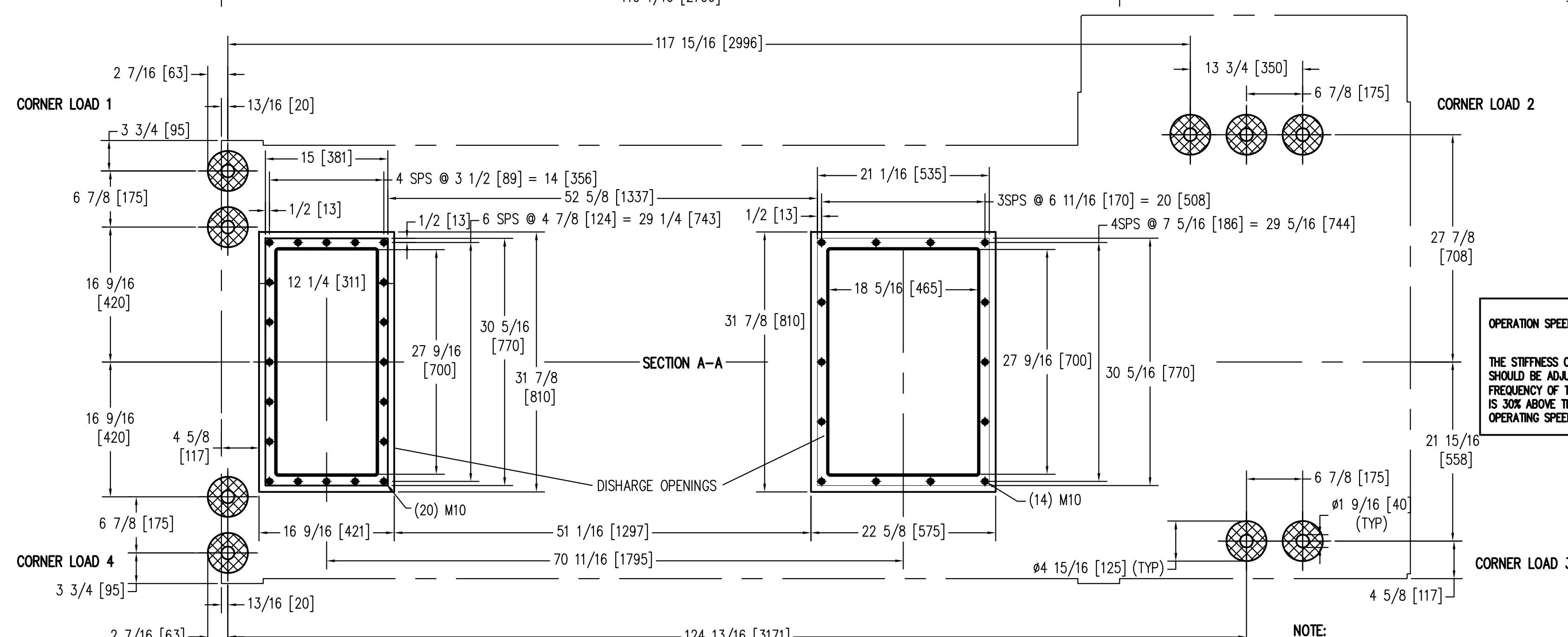
DRN CCS 1/18/07 | CHD MB 7/19/11 | SCALE 1:10 UON | REV 5

SHEET SIZE D | Y | F C | DRAWING NO. 16590-00-003

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CO, ME, CENT, DWG, C-RU





RECOMMENDED MAINTENANCE AND ACCESS SPACE–
FRONT– 2–3 FEET [1 METER]
SIDES– 2–3 FEET [1 METER]
REAR– 2–3 FEET [1 METER]

	CORNER LOAD NO.	STATIC LOAD INCL. BOWL CHARGE [LBS]	DYNAMIC LOAD [LBS] IN VERTICAL DIRECTION: OPERATING SPEED	DYNAMIC LOAD [LBS] IN VERTICAL DIRECTION: WHEN PASSING RESONANCE	DYNAMIC LOAD [LBS] IN HORIZONTAL DIRECTION: OPERATING SPEED	DYNAMIC LOAD [LBS] IN HORIZONTAL DIRECTION: WHEN PASSING RESONANCE
OPERATION SPEED : 2500–3200 RPM THE STIFFNESS OF THE SUPPORT STRUCTURE SHOULD BE ADJUSTED SO THAT THE NATURAL FREQUENCY OF THAT STRUCTURE WITH MACHINE IS 30% ABOVE THE FREQUENCY AT THE OPERATING SPEED	1	2529	126	760	52	254
	2	5755	288	1727	115	576
	3	3012	151	904	61	301
	4	2529	126	760	52	254

DIMENSIONS IN [ ] = MM/KG

APPROX. MACH. WEIGHT: 14000 LBS [6350]

REFERENCE DRAWINGS	
WIRING DIAGRAM (460/480/60)	14394-00-007
WIRING DIAGRAM (380/400/50)	14394-00-013
WIRING DIAGRAM (575/600/60)	14394-00-014
LUBRICATION & MAINTENANCE	16660-00

NOTE:
G0012054 – COMPLETE ROTATING ASSEMBLY
UNITS CF005059 – CURRENT

✱– OPTIONAL PER ORDER FORM

REV	ITEM	QTY			DESCRIPTION	PARTS LIST
	P					
6	O	✱	✱	✱	SOLID DISCHARGE HOPPER (NOT SHOWN)	17231-08
6	N	✱	✱	✱	LIQUID DISCHARGE HOPPER (NOT SHOWN)	17231-01
	M	1	1	1	MOTOR AND MECHANICAL DRIVE COMPONENTS	16621-00-001
	L	1	1	1	FEED TUBE ASSEMBLY	16606-00-001
	K	1	1	1	BELT GUARD	16605-00-001
	J	1	1	1	CONVEYOR	16604-00-001
	I	1	1	1	BOWL	16603-00-001
	H	1	1	1	CASE & COVER	16602-00-002
	G	1	1	1	BASE	16601-00-002
	F					
	E					
	D	1	1	1	ELECTRICAL PARTS LIST	16593-00-002
	C	1			CONTROL ENCLOSURE (575/600/60)	16472-00-007
	B		1		CONTROL ENCLOSURE (380/400/50)	16472-00-006
	A			1	CONTROL ENCLOSURE (460/480/60)	16472-00-005
	03	X			CENTRIFUGE ASSEMBLY (575/600/60)	16590-03-004
	02		X		CENTRIFUGE ASSEMBLY (380/400/50)	16590-02-004
	01			X	CENTRIFUGE ASSEMBLY (460/480/60)	16590-01-004

REV	CHANGE	CKD	DATE
6	ADDED ITEMS N & O PER DRR 3556	JHM / SB	9/11/13
5	ADDED LIFTING LUG DETAIL.	JMB	11/9/12
4	MODIFIED DRAWING NUMBERS IN BOM. ITEM D WAS 16593-00, ITEM G WAS 16601-00-001, ITEM H WAS 16602-00-001, AND ITEM M WAS 16621-00.	JMB	8/20/12
3	REMOVED 16673-00 AND 16674-00 FROM REFERENCE DRAWINGS LIST, REMOVED ITEMS E&F (WERE EPL'S FOR 575V AND 380V), RENAMED ITEM D(WAS ELECTRICAL PARTS LIST 460V), RENAMED ITEM L (WAS FEED COMPONENT ASSEMBLY), RENAMED ITEM M (WAS DRIVE COMPONENTS), REMOVED ITEM N (WAS MOTOR, BOWL DRIVE), REMOVED ITEM O (WAS MOTOR CONVEYOR DRIVE), REMOVED ITEM P (WAS GEAR UNIT), ADDED PARTS LIST NUMBERS TO ITEMS 01, 02 AND 03, ADDED VFD TO TITLE, ADDED UNIT NUMERS TO NOTE.	JMB	3/5/12
2	ADDED NOTE; ITEM G WAS 16601-00; ITEM H WAS 16602-00; ITEM I WAS 16603-00; ITEM J WAS 16604-00; ITEM K WAS 16605-00	JMB	12/6/11
1	UPDATED VIEW OF CONTROL ENCLOSURE, COG; WEIGHT WAS 2010 LBS	EJR	11/14/11

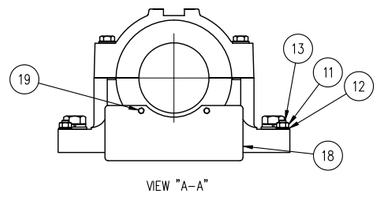
TITLE: CENTRIFUGE GENERAL ARRANGEMENT
DE-7200 VFD NON EX-PROOF

DWN CCS | CKD | DATE 1/18/2007 | SCALE 1:20 | REV 6
SHEET SIZE D | Y | F C | DWN EJR 8/25/11 | CKD
DRAWING NO. 16590-00-004

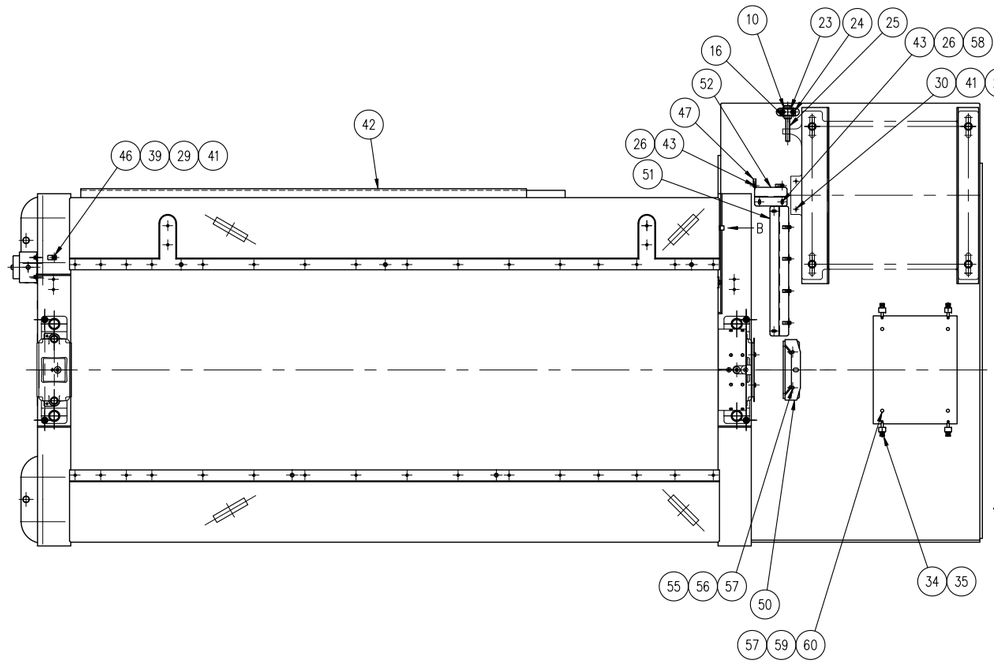
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

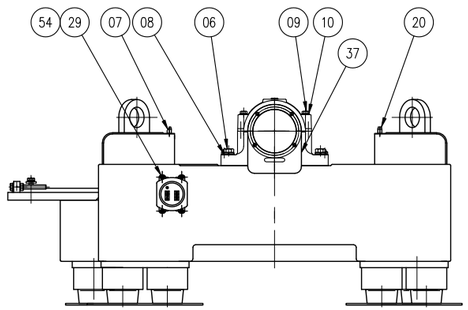
LO, WE, CENT, MAN, C-RM

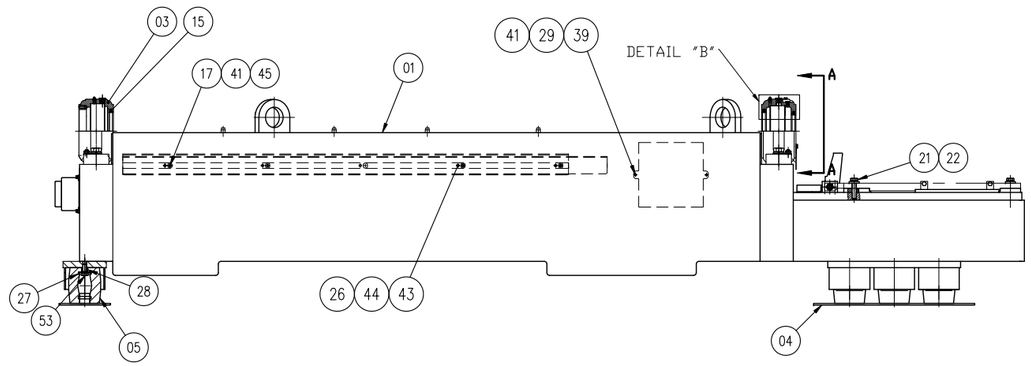
ITEM	DESCRIPTION	TORQUE SETTING (Nm)
06	M24-3.0 X 80mm	680 [501.5 FT-LBS]
09	M16-2.0 X 100mm	195 [143.8 FT-LBS]

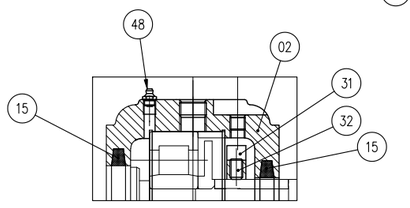


VIEW "A-A"

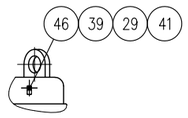








DETAIL "B"



VIEW "B"

6	4		60	G0007976	FLAT WASHER
6	4		59	G0012130	HEX HED BOLT
6 5	4		58	WFSS-25	FLAT WASHER
6	6		57	WLSS-M12	LOCK WASHER
6	2		56	PP1524	FLAT WASHER
	2		55	G0012127	HEX HEAD BOLT
5	4		54	G0012998	SOCKET HEAD SCREW
4		9	53	G0007745	HEX HEAD BOLT
3	1		52	17103-01	SPEED SENSOR CABLE GAURD
3	1		51	17103-01-001	SPEED SENSOR CABLE GAURD
3	1		50	17089-01-001	SPEED SENSOR BRACKET
2		X	49	G0012590	BASE ASSEMBLY
2	2		48	G0007887	GREASE FITTING
2 1	6		47	PP1074-CLIP	FASTENING CLAMP
1	2		46	G0008177	FASTENING CLAMP
	5		45	WFSS-38-SAE	FLAT WASHER
	5		44	G0007743	WASHER
6	10		43	G0007907	SOCKET HEAD SCREW
	1		42	16554-01-001	CABLE TRAY ASSEMBLY
2 1	15		41	G0007910	LOCK WASHER
4					
6 2 1	4		39	G0007909	SOCKET HEAD SCREW
2			38		
2		1	37	17495-01	GREASE DEFLECTOR LIQUID END
2			36		
		4	35	G0007766	HEX NUT
		4	34	G0012401	ADJUSTING SCREW
4			33		
		3	32	G0007755	SET SCREW
		1	31	G0007754	CAM RING
5	3		30	G0007756	HEX HEAD BOLT
6 4 2 1	11		29	G0007750	FLAT WASHER
4 2		9	28	G0007747	BUSHING
4 2		9	27	G0007746	FLANGE
6	15		26	G0008101	LOCK WASHER
		1	25	G0007737	HEX HEAD BOLT
5		2	24	G0007736	SOCKET HEAD SCREW
		1	23	G0007735	TENSION BLOCK
		4	22	G0012400	LOCK WASHER
		4	21	G0007733	HEX HEAD BOLT
		2	20	G0007739	LOCATING PIN
		2	19	G0007731	HEX HEAD BOLT
		1	18	G0012547	GREASE DEFLECTOR SOLID END
5	5		17	G0007908	SOCKET HEAD SCREW
		1	16	G0007793	HEX NUT
6		6	15	G0007727	FELT STRIP
6			14		
		4	13	G0007725	TAPER PIN
		4	12	G0007724	FLAT WASHER
		4	11	G0007723	HEX NUT
		5	10	G0007722	FLAT WASHER
		4	09	G0007721	HEX HEAD BOLT
		4	08	G0012399	LOCK WASHER
		3	07	G0007753	LOCATING PIN
		4	06	G0007718	HEX HEAD BOLT
		9	05	G0007717	VIBRATION ISOLATOR
		1	04	**17279-01**	MOUNTING PLATE ASSY
		1	03	G0012373	PILLOW BLOCK, LIQUID END
		1	02	G0012372	PILLOW BLOCK, SOLID END
		1	01	G0012442	BASE FRAME
	QTY	ITEM		PART NUMBER	DESCRIPTION/PART NAME

REF GA: 16590-00-003
REF GA: 16590-00-004
REF GA: 16590-00-005
REF GA: 16590-00-006

NOTE:
USED WITH UNITS CF005059 - CF005113

REV	CHANGE	CKD	DATE
6	REMOVED ITEM 14 (WAS G0007726). CHANGED PART NUMBERS OF ITEMS 54 (WAS G0007748) AND 56 (WAS G0012777). CHANGED QTY ON ITEMS 15 (WAS 2), 26 (WAS 5), 29 (WAS 22), 39 (WAS 10), 43 (WAS 5), 57 (WAS 2) AND 58 (WAS 2). ADDED ITEMS 59 AND 60. PER SHOP REQUEST.	JMB	12/26/12
5	ADDED ITEMS 54-58. CHANGED PART NUMBER OF ITEM 17 (WAS G0007908). CHANGED QUANTITY OF ITEM 30 (WAS 4). PER DRR # 3027.	JMB	10/29/12
4	MADE NEW COLUMN FOR ALL PARTS THAT DERRICK PUTS ON MACHINE. REMOVED ITEMS 33 (WAS G0007781) AND 40 (WAS DUPLICATE OF ITEM 29). CHANGED QTY OF 29 (WAS 20). ADDED VIEW "B". ADDED ITEMS 27,28 AND 53.	JMB	8/17/12
3	ADDED ITEMS 50-52.	JMB	7/18/12
2	REMOVED ITEMS 27 (WAS G0007746), 28 (WAS G0007747), 36 (WAS G0007884) AND 38 (WAS 16593-03). CHANGED QTY OF ITEMS 29 (WAS 8), 39 (WAS 4) AND 41 (WAS 9).	JMB SB	3/26/12
1	CHANGED ITEMS 37 (WAS G0012432) AND 47 (WAS G0008027), ADDED ITEMS 48 AND 49. ADDED ITEMS 46 & 47; ITEM 29, QTY WAS 4; ITEM 39 QTY WAS 2; ITEM 41, QTY WAS 7.	JMB	2/13/12

TITLE: BASE PARTS LIST
DE-7200 CENTRIFUGE

DWN CCS | CKD | DATE 1/19/07 | SCALE NTS | REV 6

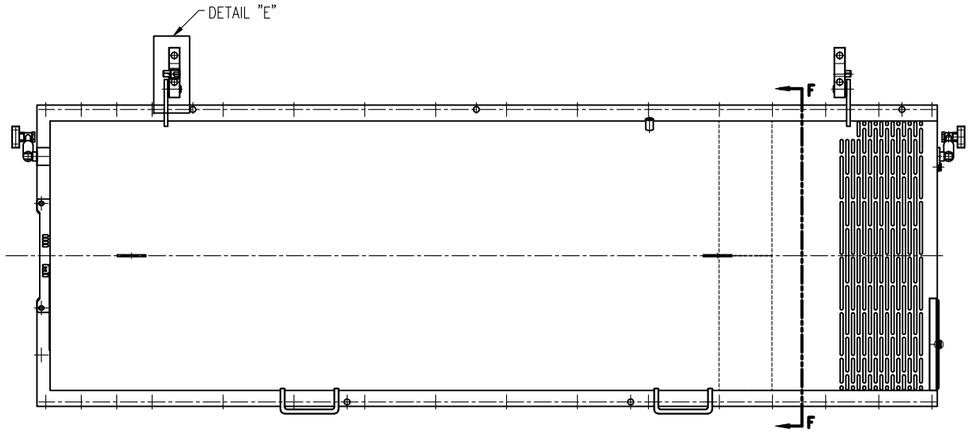
C | Y | DWN JMB 12/12/11 | CKD

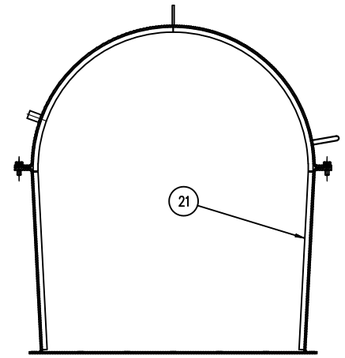
SHEET SIZE F C

DRAWING NO. 16601-00-001

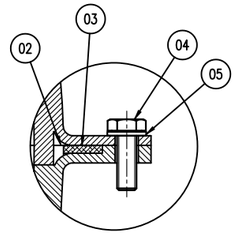
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CENT, MAN, C-RM

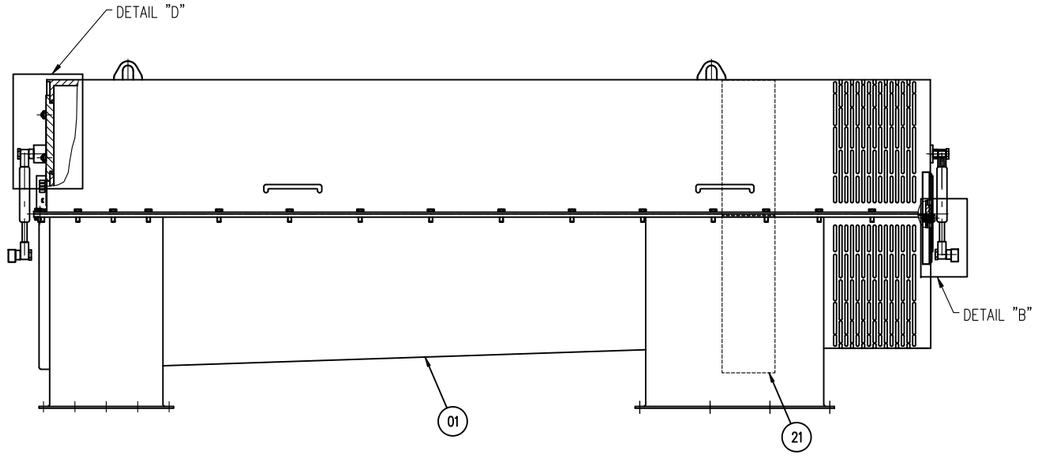


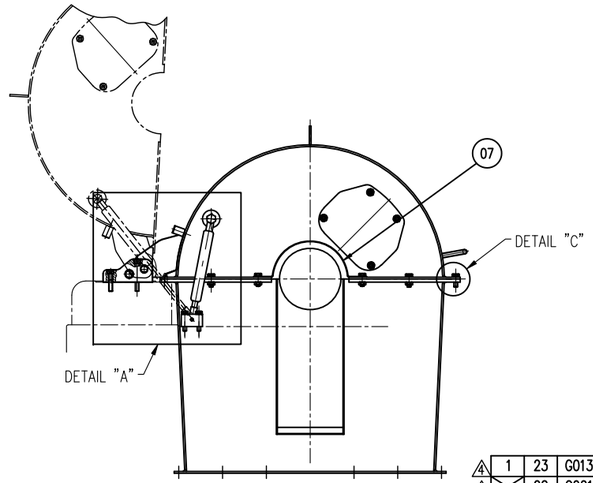


SECTIONAL VIEW "F"

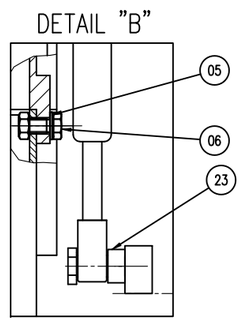


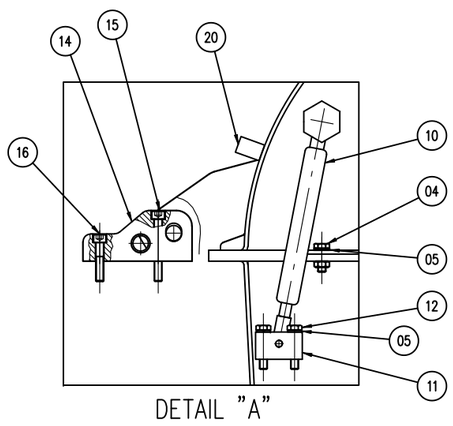
DETAIL "C"

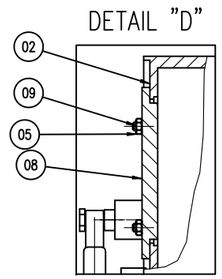


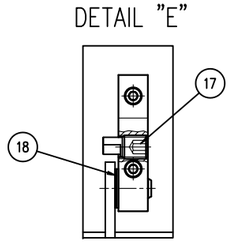


4	1	23	G013590	MOUNTING PIN KIT
1	X	22	G0012511	CASE ASSEMBLY COMPLETE
	1	21	16995-01	WEAR PLATES
	1	20	G0007777	PIPE PLUG
1		19		
	4	18	G0007775	FLAT WASHER
	2	17	G0007774	STOP PIN
	2	16	G0007773	SOCKET HEAD SCREW
	2	15	G0007772	SOCKET HEAD SCREW
	2	14	G0007771	HINGE BRACKET
1		13		
	4	12	G0007769	HEX HEAD BOLT
2 1	2	11	G0007768	CYLINDER MOUNT
	2	10	G0007767	GAS CYLINDER
	4	09	G0007766	HEX NUT
1	1	08	G0012512	COVER
	1	07	G0007764	SHAFT GAURD
	2	06	G0007763	HEX HEAD BOLT
1	46	05	G0007729	FLAT WASHER
	36	04	G0007761	HEX HEAD BOLT
3	1	03	16929-01	CASE SEAL
	1	02	G0007759	SEAL TAPE
	1	01	G0012222	CASE
QTY	ITEM	PART NUMBER		DESCRIPTION/PART NAME









REF: 16590-00-003
REF: 16590-00-004
REF: 16590-00-005
REF: 16590-00-006

NOTE:
USE FOR UNITS CF0050591-CF005113

REV	CHANGE	CKD	DATE
4	ADDED ITEM 23. UPDATED VIEWS	JMB	4/9/13
3	CHANGED QTY OF ITEM 03 (WAS 4).	JMB	8/30/12
2	MODIFIED ITEM 11 (WAS G0012513)	JMB	5/16/12
1	REMOVED ITEMS 13 (WAS G0007770) AND 19 (WAS G0007776). CHANGED ITEMS 08 (WAS G0007765) AND 11 (WAS G0007768). CHANGED QTY OF ITEM 05 (WAS 42).	JMB SB	3/26/12
	ADDED ITEM 22		

TITLE: CASE & COVER PARTS LIST
DE-7200 CENTRIFUGE

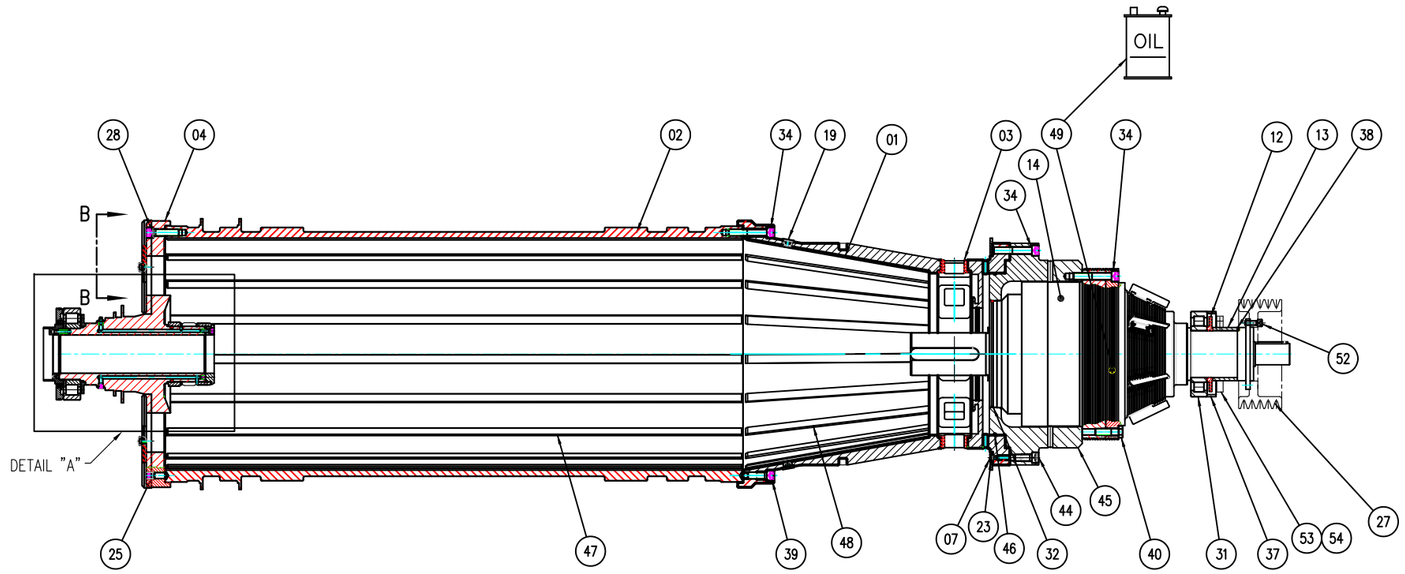
DWN CCS | CKD | DATE 1/23/07 | SCALE NTS | REV 4

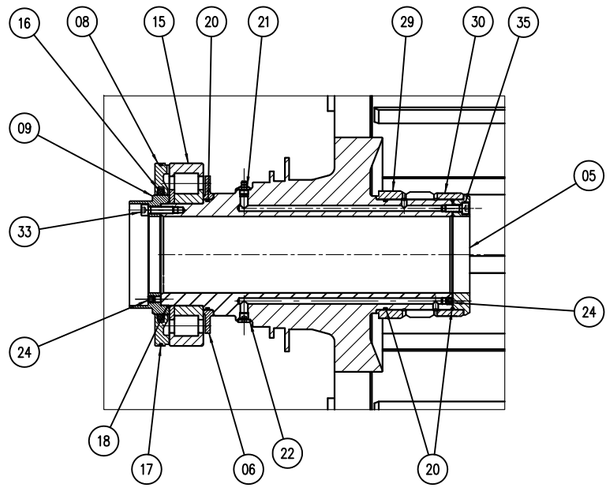
SHEET SIZE C | Y | DWN JMB 12/13/11 | F C | CKD

DRAWING NO. 16602-00-001

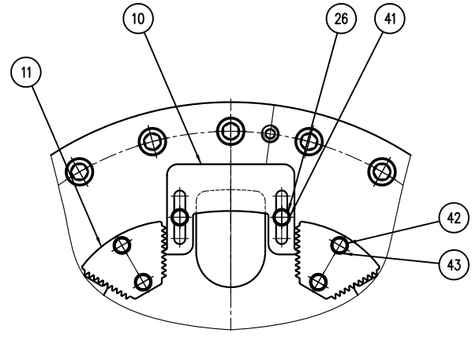
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CENT, MAN





DETAIL "A"



SECTION B-B

ITEM	DESCRIPTION	TORQUE SPEC (Nm)
07	M8-1.25 X 16mm	21.6 [15.9 FT-LBS]
5 28	M16-2.0 X 60mm	183.3 [135.2 FT-LBS]
33	M8-1.25 X 30mm	21.6 [15.9 FT-LBS]
34	M16-2.0 X 90mm	136.5 [100.7 FT-LBS]
35	M8-1.25 X 20mm	21.6 [15.9 FT-LBS]
39	M16-2.0 X 45mm	183.3 [135.2 FT-LBS]
40	M16-2.0 X 55mm	136.5 [100.7 FT-LBS]
42	M8-1.25 X 20mm	16.1 [11.9 FT-LBS]

3 2	3	3	54	G0007755	SET SCREW
3 2	1	1	53	G0007754	CAM RING
2		4	52	G0007873	SOCKET HEAD SCREW
2 1	X		51	G0012484	BOWL ASSEMBLY
2			50		
	1	1	49	G0008986	GEAR OIL
3		18	48	17595-02	BOWL EXTENSION STRIPS
3 1		18	47	17595-01	BOWL STRIP
	1	1	46	G0012431	O-RING
	1	1	45	G0012223	GEAR BOX ADAPTER
	4	4	44	G0012411	SOCKET HEAD SCREW
2	12	12	43	G0007750	FLAT WASHER
	12	12	42	G0007833	HEX HEAD BOLT
	12	12	41	G0007729	FLAT WASHER
	4	4	40	G0012407	HEX HEAD BOLT
	4	4	39	G0007830	SOCKET HEAD SCREW
	1	1	38	G0007829	O-RING
	1	1	37	G0007828	SPACER RING
2			36		
	6	6	35	G0007826	SOCKET HEAD SCREW
	60	60	34	G0007825	SOCKET HEAD SCREW
	6	6	33	G0007824	SOCKET HEAD SCREW
	1	1	32	G0007823	O-RING, GEAR BOX
	1	1	31	G0007822	ROLLER BEARING, SOLID END
	1	1	30	G0007821	SEALING RING
	1	1	29	G0007820	SEALING RING
	24	24	28	G0007819	SOCKET HEAD SCREW
2		1	27	G0012485	V-BELT PULLEY
	12	12	26	G0007763	HEX HEAD BOLT
	4	4	25	G0007818	SET SCREW
	6	6	24	G0007817	SET SCREW
7 2	1	1	23	17408-01	WEAR RING
	1	1	22	G0007815	PIPE PLUG
	1	1	21	G0007814	LUBRICATION NIPPLE
	3	3	20	G0007813	O-RING, LIQUID END
	2	2	19	G0012412	SCREW PLUG
	1	1	18	G0007811	O-RING, CLAMPING RING-PILLOW
	1	1	17	G0007810	PACKING SEAL, LIQUID END
	1	1	16	G0007809	FELT RING
	1	1	15	G0007808	ROLLER BEARING, LIQUID END
	1	1	14	G0012299	GEAR BOX
	1	1	13	G0007806	SPACER RING
	1	1	12	G0012406	GREASE RING
4	6	6	11	17152-01-001	WEIR GUAGE PLATE
6	6	6	10	17151-01	WEIR PLATE
	1	1	09	G0007802	CLAMPING RING, PILLOW BLOCK
	1	1	08	G0007801	RETAINING WASHER
	10	10	07	G0012413	COUNTERSUNK BOLT
	1	1	06	G0007799	FLINGER
	1	1	05	G0007798	THRUST WASHER
	1	1	04	G0012404	BOWL HEAD, LIQUID END
	8	8	03	G0007796	WEAR INSERT, SOLID DISCHARGE
	1	1	02	G0012403	CYLINDRICAL BOWL
	1	1	01	G0012402	CONICAL BOWL
	QTY	ITEM		PART NUMBER	DESCRIPTION/PART NAME

REF: 16590-00-003

NOTE:
FOR USE WITH UNITS CF005059 - CURRENT

REV	CHANGE	CKD	DATE
7	REVISED QUANTITY OF ITEM 23 (WAS 2). PER DRR #3601	TPO SB	11/21/13
6	ITEM 10- 17151-01 WAS G0007803	EJR	8/9/13
5	IN TORQUE SPEC TABLE, ITEM 28: M16 WAS M4 (TYPO)	EJR	9/20/12
4	ITEM 11 - 17152-01-001 WAS G0012405, CHANGE PER DRR 3020	JHM JTF	9/18/12
3	CHANGED QUANTITIES OF ITEMS 47 (WAS *) AND 48 (WAS *). ADDED QUANTITIES TO ASSEMBLY 51 COLUMN FOR ITEMS 53&54.	JMB	8/9/12
2	REMOVED ITEMS 36 (WAS G0007827) AND 50 (WAS G0008169), CHANGED ITEMS 23 (WAS 17408-01), 27 (WAS G0007959). ADDED ITEMS 52, 53 AND 54,	JMB	3/22/12
1	ADDED PART NUMBER TO ITEM 51.		
1	ADDED ITEMS 49, 50 AND 51, ADDED PART NUMBERS FOR ITEMS 47 AND 48	JMB	2/22/12

TITLE: BOWL PARTS LIST
DE-7200 CENTRIFUGE

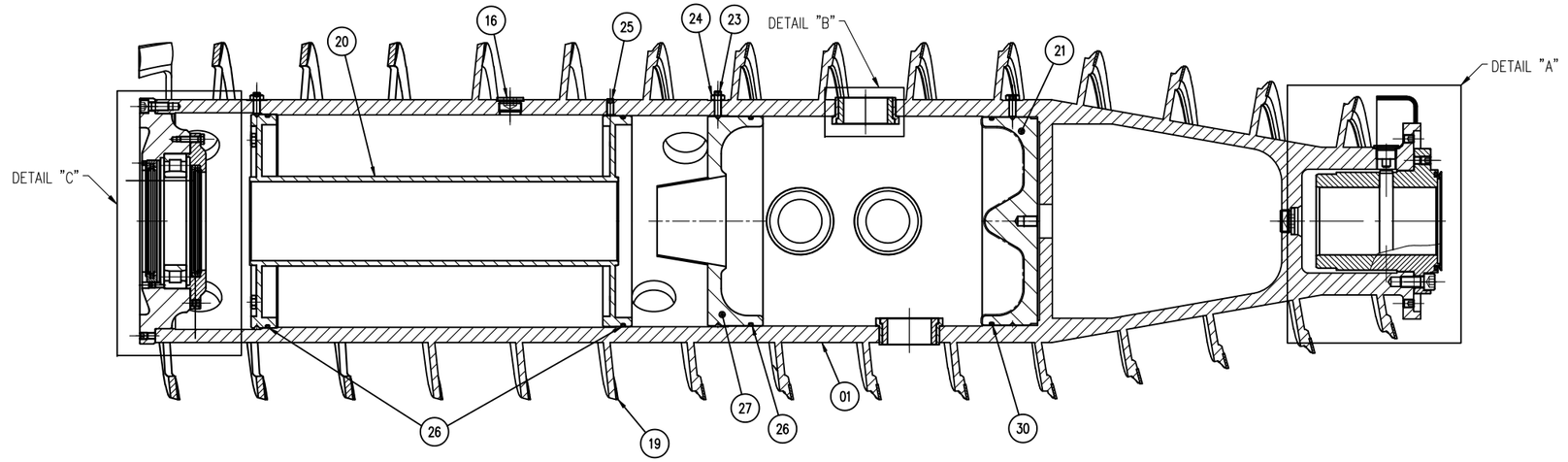
DWN CCS | CKD | DATE 1/31/07 | SCALE NTS | REV 7

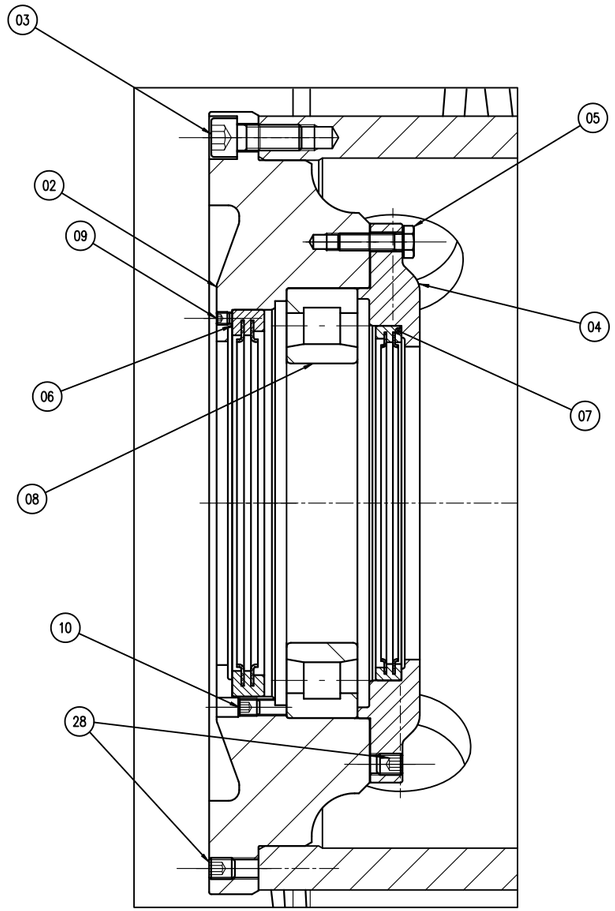
SHEET SIZE C | Y | DWN JMB 12/7/11 | F C | CKD

DRAWING NO. 16603-00-001

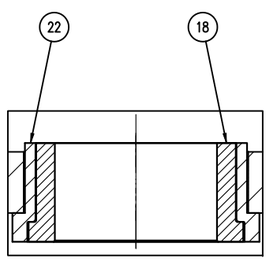
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CENT, MAN, C-RM

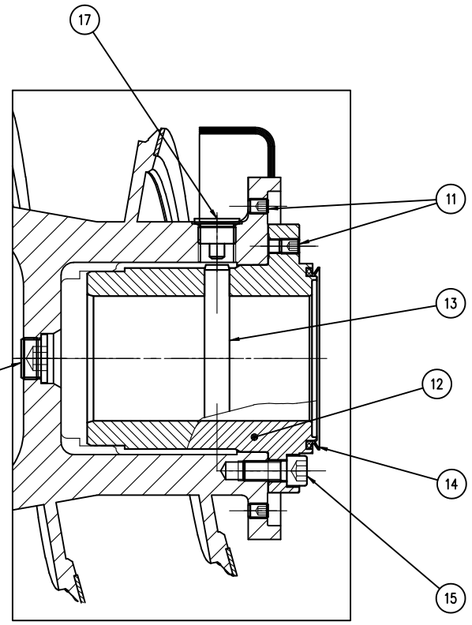




DETAIL "C"



DETAIL "B"



DETAIL "A"

ITEM	DESCRIPTION	TORQUE SETTING (Nm)
03	M12-1.75 X 30mm	74.3 [54.8 FT-LBS]
05	M8-1.25 X 30mm	16.1 [11.9 FT-LBS]
15	M16-2.0 X 35mm	183.3 [135.2 FT-LBS]
4 23	M10-1.5 X 35mm	31.97 [23.58 FT-LBS]
4 24	M10-1.5 HEX NUT	31.97 [23.58 FT-LBS]

QTY	ITEM	PART NUMBER	DESCRIPTION/PART NAME
2 1	30	G0012500	O-RING
3 1 X	29	G0012505	CONVEYOR ASSEMBLY COMPLETE
	4	28	G0007878	SET SCREW
1	27	G0012433	FEED ACCELERATOR REAR
2 3	26	G0012260	O-RING
3	25	G0012259	SET SCREW
9	24	G0007766	HEX NUT
9	23	G0012258	SET SCREW
6	22	G0012257	FEED NOZZLE SLEEVE
1	21	G0012256	FEED ACCELERATOR FRONT
1	20	G0012255	PIPE PROTECTOR
1 420	19	G0012254	TILE & BACKING PLATE
1 6	18	G0012498	FEED NOZZLE
2	17	G0007885	PIPE PLUG
3	16	G0012261	PIPE PLUG
12	15	G0007884	SOCKET HEAD SCREW
1	14	G0007883	LIP SEAL
1	13	G0007882	DOWEL PIN
1	12	G0007881	DRIVE SLEEVE
8	11	G0007880	SET SCREW
2	10	G0007879	SET SCREW
1	09	G0012262	SET SCREW
1	08	G0007877	ROLLER BEARING
1	07	G0007876	SHAFT SEAL
1	06	G0007875	SHAFT SEAL
8	05	G0012253	HEX HEAD BOLT
1	04	G0012252	SEAL COVER
8	03	G0012251	SOCKET HEAD SCREW
2 1	02	G0012497	BEARING HOUSING
1	01	G0012224	CONVEYOR

NOTE:
USE PARTS LIST ON UNITS CF005059 – CURRENT

REF GA: 16590-00-003
REF GA: 16590-00-004
REF GA: 16590-00-005
REF GA: 16590-00-006

REV	CHANGE	CKD	DATE
4	ADDED TORQUE VALUES FOR ITEMS 23 & 24 PER DRR # 3510	BCJ	7/5/13
3	CHANGED ITEM 29 (WAS G0012445)	JMB	8/30/12
2	ADDED ITEM 30, CORRECTED PART NUMBER FOR ITEM 02, ADDED NOTE FOR UNIT NUMBERS, CHANGED QTY OF ITEM 26 (WAS 4)	JMB SB	3/22/12
1	ITEM 02, ADDED PART NUMBER; ITEM 18 WAS G0012417, ADDED ITEM 29, CHANGED QTY AND PART # ON ITEM 19 (WAS 475 – G0009483).	JMB	2/3/12

TITLE: CONVEYOR PARTS LIST
DE-7200 CENTRIFUGE

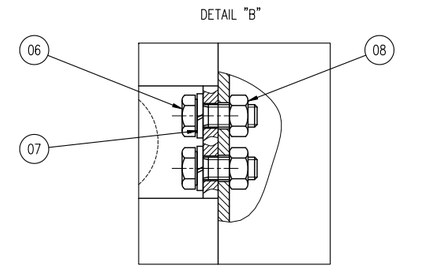
DWN CCS | CKD | DATE 2/1/07 | SCALE NTS | REV 4

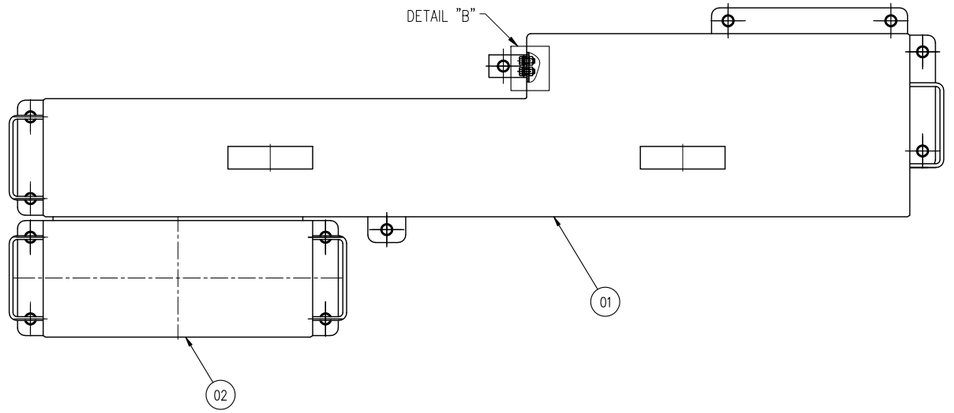
SHEET SIZE C | Y | F C | DWN JMB 12/7/11 | CKD

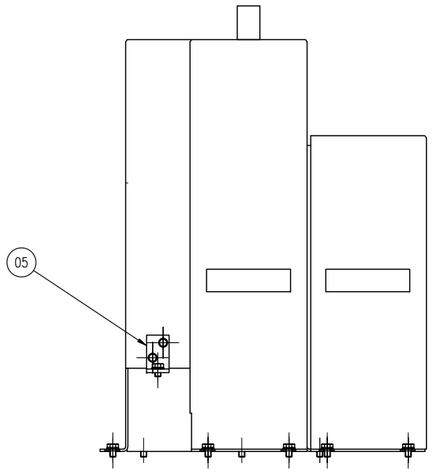
DRAWING NO. 16604-00-001

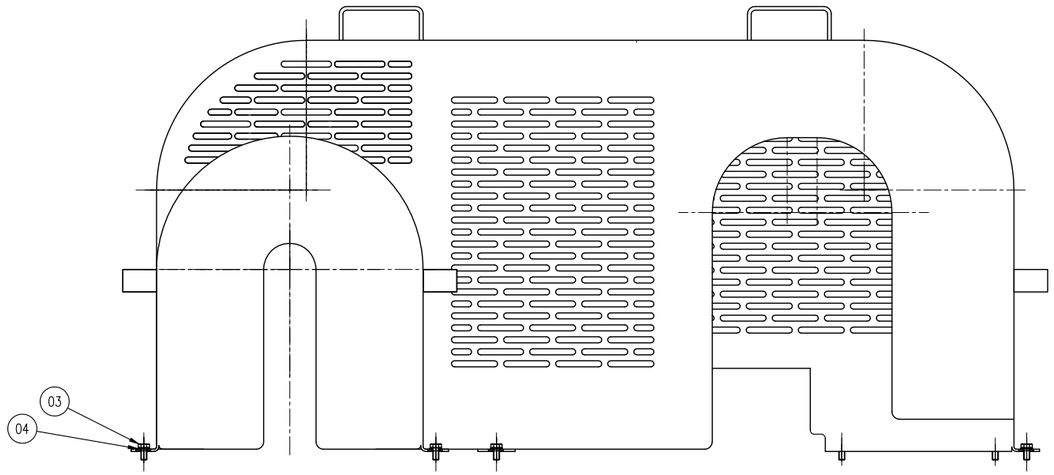
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CENT, MAN









		QTY	ITEM	PART NUMBER	DESCRIPTION/PART NAME
1		09	G0012504		BELT GAURD ASSEMBLY
		2	08	G0007860	HEX NUT
2		2	07	G0008101	LOCK WASHER
		2	06	G0012416	HEX HEAD BOLT
		1	05	G0007857	MOUNTING ANGLE
1		12	04	G0012501	FLAT WASHER
		12	03	G0007756	HEX HEAD BOLT
		1	02	G0012415	SHAFT GUARD
1		1	01	G0012414	BELT GUARD

REF GA: 16590-00-003
REF GA: 16590-00-004
REF GA: 16590-00-005
REF GA: 16590-00-006

NOTE:
USE WITH UNITS CF005036 - CURRENT

REV	CHANGE	CKD	DATE
2	CHANGED ITEM 07 (WAS G0007859)	JMB	4/25/12
1	ITEM 01, ADDED PART NUMBER; ITEM 04, CHANGED PART NUMBER TO G0012501, WAS G0007850; ADDED ITEM 09; UPDATED BALLOONS	JMB SB	2/13/12

TITLE: BELT GUARD PARTS LIST
DE-7200 CENTRIFUGE

DWN CCS | CKD | DATE 1/31/07 | SCALE NTS | REV 2

C | Y | DWN JMB 12/7/11 | F C | CKD

SHEET SIZE | DRAWING NO. 16605-00-001

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CENT, MAN

CONDENSOR FAN
1/2 HP MOTOR
460 VAC
60HZ 3 PH
(G0007588)

3/4" NPT ELBOW, 90° (CRH-EL296)
3/4" NPT CORD FITTING, STRAIGHT (TBS2535)
3/4" NPT CORD FITTING, STRAIGHT (TBS2535)

THHN/THWN 6 AWG
THHN/THWN 14 AWG
GEXOL 16AWG-6C (G0002967)

FEED PUMP INPUT FUSES
FUSE HOLDER (G0007221)
FUSES-60 AMP (G0007698)(3)
FUSE COVER/INDICATOR (G0007223)(3)
60 AMP

PARALLEL (2) THHN 2 AWG
CENTRIFUGE BOWL INPUT FUSES
FUSE HOLDER (G0007631)(6)
FUSES 225 AMP (G0007632)(3)
225 AMP

AIR CONDITIONER INPUT FUSES
FUSE HOLDER (G0007214)
FUSES-15 AMP (G0003493)(3)
15 AMP

CONDENSOR MOTOR INPUT FUSES
FUSE HOLDER (G0007214)
FUSES-3.0 AMP (G0008792)(3)
3 AMP

AIR CONDITIONER (G0002881)
THHN/THWN - 14 AWG
GND 14AWG
THERMOSTAT INPUT CONTROL 24 VDC
A/C PRESSURE FAILURE
A/C COMPRESSOR MOTOR OVERLOAD
A/C EVAPORATOR BLOWER MOTOR OVERLOAD

(G0009974 SENSOR)
(G0009972 CABLE)
TEMP RTD SENSOR 4-20MA OUTPUT

CONVEYOR CONTROLLER (G0007690)
INVERTER
OUTPUT COM TO AC-15
DIGITAL OUT-18
TEMP RTD INPUT-4
TEMP RTD COM 0VDC-3
AC PRESSURE FAILURE-28
AC COMP MTR OL-29
AC EVAP BLWR MTR OL-27
E-STOP-32
VIB MON-31
SPEED SENSOR-30
TEMP SENSOR SOLID 1-
TEMP SENSOR LIQUID 2-
COM-25
RJ45
4-20MA
ANA1B BLK
ANA1A RED
ANA2B BLK
ANA2A RED
MAX OUT 77 AMP
0 VAC FAN COM-25
120 VAC FAN
FUSE HOLDER (G0007224)(2)
FUSES-150 A (G0007225)(2)
(G0003824) DLO 2 AWG
MAX OUTPUT 42 AMP

FEED PUMP CONTROLLER (G0007689)
INVERTER
PUMP ENABLE-29
E-STOP-32
VIB MON-31
SPEED SENSOR-30
COM-25
CLUTCH SPD SENSOR
ANALOG 4-20MA 4+
BOWL SPD SENSOR 1-
ANALOG 4-20MA 2+

BOWL CONTROLLER (G0007573)
INVERTER
PUMP RESTART-29
E-STOP-32
VIB MON-31
SPEED SENSOR-30
TEMP SENSOR LIQUID 1-
4-20MA
COM-25
RJ45
42 BLK 4-20MA +FLOW MTR INPUT
46 BLK 4-20MA -FLOW MTR INPUT
MAX OUT 180 AMP

ETHERNET CABLE (G0007954)
ETHERNET CABLE (G0007953)
ETHERNET CABLE (G0007955)
ETHERNET CABLE (G0007952)
ETHERNET CABLE (G0007951)
ETHERNET RJ45 SWITCH (G0007231)
CONNECT SHIELD GROUNDED END OF ETHERNET CABLE AT SWITCH (MARKED W/GREEN TAPE)

PLC (G0007228) BATTERY (G0008349) ETHERNET RJ45
MEMORY CARD COMPACTFLASH (G0007995)
POWER SUPPLY 120 V 2 A (G0007229) (G0007230)
120V-L1 0V-N G
BLK 120V-L1 THHN/THWN - 14 AWG
WHT 0V-N
120VAC

ETHERNET RJ45 HMI (G0007976)
USB
USB/PS2 ASSY (17006-02)
PS2
IDC
MOUSE/POINTER ASSY (17006-01)

POWER SUPPLY 24 VDC, 5 AMPS (G0003552)
THHN/THWN - 14 AWG
1 RED
25 BLK
EMERGENCY STOP PUSHBUTTON (G0005325)
EMER STOP CIRCULAR LEGEND (G0007244)
RED
18 AWG SHIELDED

OUTPUT SURGE PROTECTOR (G0003504)
INPUT
14 AWG
TERMINAL BLOCK (G0008571) (G0008544) (G0008507)(2)
TOUCH PROOF TERMINAL COVERS (G0002873)
FUSE COVERS / PULLERS (G0002874)
FUSE-7.0 A (G0002911)
FUSE-2.5 A (G0002910)
500 VA TRANSFORMER (G0003494) 480VAC
120 VAC
480 VAC
THHN/THWN - 14 AWG
33

18 AWG SHIELDED
+24VDC 1 RED
-0VDC
+24VDC
AN3A BLK
AN4A RED
AN3B BLK
AN4B RED
AN13C BLK
AN9C RED
AN13A BLK
AN9A RED

INTRINSIC BARRIER (17244-02)
CLUTCH SPEED SENSOR
BOWL SPEED SENSOR
INTRINSIC BARRIER (17325-01)
LIQUID END
SOLID END
INTRINSIC BARRIER (G0009286)
TOGGLE SETTINGS
NO OFF
NO OFF
NO OFF
VIBRATION AND E-STOP BARRIER
ALL 18 AWG BLUE INTRINSIC WIRING

NOTE: NO CONNECTION OR TIE POINT, CROSSING ONLY

NON-INTRINSIC TERMINAL BLOCKS
(G0009324)(2)GREEN 4 PT
(G0008562)(7) GREY 4 PT
(G0008563)(2)ORANGE 4 PT
(G0008597)(2) END
(G0009839) JUMPER

TERMINAL BLOCK (G0008891, G0008892) (G0008893)X(4)
TERMINAL BLOCK (G0008891, G0008892) (G0008893)X(4)
TERMINAL BLOCK (G0008966) (G0008890)X(4)
SPARE SPARE SPARE

1" NPT (SHPP-100) SPARE
1-1/2" NPT (SHPP-150)
2" NPT (SHPP-200)
2-1/2" NPT (SHPP-250)
1" NPT (SHPP-100)
1" NPT PLUG (SHPP-100)
FLOW METER INTERFACE
GROUND SHIELDS AT PLUG THIS END ONLY

RECOMMENDED CABLE MAX 52 AMP AT 40 C PROVIDED BY CUSTOMER SIZED FOR MOTOR CURRENT
RECOMMENDED CABLE SIZED FOR 72 AMP AT 40 C PROVIDED BY CUSTOMER
RECOMMENDED CABLE SIZED FOR 172 AMP AT 40 C PROVIDED BY CUSTOMER

PUMP MOTOR NOT TO EXCEED 30 HP
PUMP 30HP MOTOR 460 VAC 60 HZ 3 PH
CONVEYOR 60HP MOTOR 460 VAC 60 HZ 3 PH 72 FLA (G0009524)
BOWL 150HP MOTOR 460 VAC 60 HZ 3 PH 172 FLA (G0009523)
PUMP AND MOTOR PROVIDED BY CUSTOMER

PUMP RESTART REMOTE N.O. CONTACT (BY OTHERS) WHEN CLOSED AND PROGRAMMED PUMP WILL RESTART (IF PUMP WAS RUNNING)
PUMP ENABLE REMOTE N.O. CONTACT (BY OTHERS) WHEN CLOSED AND PROGRAMMED PUMP IS ENABLED TO RUN, WHEN OPEN PUMP WILL STOP
NOTE:
CABINET IS SHIPPED WITH TERMINALS 3 AND 4 JUMPERED TO BE REMOVED BY CUSTOMER IF REMOTE PUMP ENABLE IS USED

DO NOT PLACE JUMPER BETWEEN TERMINALS 1 AND 2 AS PUMP MAY START UNINTENTIONALLY

THESE TERMINALS ARE NOT INTENDED FOR INTRINSICALLY SAFE CIRCUITS CONTACT DERRICK CORPORATION IF REMOTE PUMP START/STOP CONTACTS ARE TO BE LOCATED IN A HAZARDOUS AREA (REFER TO DWG # 17237-00)

CABLE,SHIELDED - INTRINSIC (18 COND 18 AWG) (16593-47)(100 FT)
EQUIP GRD
SHLD GRD

CONTROL RECEPTACLE
HOOD/SIDE ENTRY (G0007850)
MALE CAGE-CLAMP TERMINAL (G0007852)
COVER/WEDID (G0007849)
CABLE GLAND (7-17 mm) (G0009238)
CONTROL PLUG
EMERGENCY STOP PUSHBUTTON (G0005325)
EMER STOP CIRCULAR LEGEND (G0007244)
INCREASED SAFETY SENSOR SYSTEM JUNCTION BOX (16618-01)

GROUND BUS BAR (G0005309)
INCOMING GROUND LUG (G0007213)(2) (2) #4-350MCM AWG CU GND
POWER DISTRIBUTION BLOCK (G0008941)
POWER DISTRIBUTION BLOCK COVER (G0009942)(3)
3" NPT w/3"-2" REDUCER (G0007258) (SHPP-200)
2" NPT W/2" PLUG (SHPP-200)

SUPPLY 480/480 VOLTS 3 PH 60 HZ
300 AMP SERVICE
BASED ON CONNECTED LOAD OF 240 AMP
MAIN POWER DISCONNECT
SUPPLIED BY CUSTOMER

RECOMMENDED CABLE HOOK-UP
QTY (1) COPPER COND PER PHASE SIZED FOR 300 AMP
OR (2) COPPER CONDUCTORS PER PHASE SIZED FOR 150 AMP
AT 75C TEMP RISE AND 40C AMBIENT
USE XP SEALING GLAND FOR (1) 3" NPT OR (2) 2" NPT

CAUTION/WARNING

WHEN WIRING THE INPUT POWER WITH PARALLEL WIRE, YOU MUST ENSURE THAT THE CONDUCTORS ARE GROUPED WITH THE SAME PHASE AND THAT BOTH POWER SOURCES ARE IN PHASE AND ROTATING IN THE SAME "CLOCKWISE" DIRECTION. FAILURE TO DO SO WILL RESULT IN PERSONNEL OR EQUIPMENT DAMAGE OR BOTH.

BOWL SPEED SENSOR (G0007861) (G0007862 CABLE)
TEMPERATURE SENSOR LIQUID END (G0007265)
TEMPERATURE SENSOR SOLID END (G0007712)
CLUTCH SPEED SENSOR (G0009136) (G0007862 CABLE)
VIBRATION SWITCH (G0003015)
SENSOR CABLE

REF: CA#16590-00-004
REF: PL#16472-00-005
REF: EPL#16593-00-002

REVISION 4 STARTED USING ON DE-7200 UNIT# CF5036-X
REVISION 5 STARTED USING ON DE-7200 UNIT# CF5044-X
REVISION 13 STARTED USING ON DE-7200 AFTER UNIT# CF5171

REV	CHANGE	CHD	DATE
15	ADDED FLOW METER INTERFACE, CHANGE INTRINSIC BARRIER TO PROGRAMMED (WAS G0007745)	BJB	07/10/13
14	REFER TO MODEL SPACE FOR REV'S 1-13, REVISE OUTPUT WIRING OF BOWL FEEDER REVERSE LEADS, REVISE REF @0003-00 TO @0003-00-002 FOR NEW DESIGN	JFS	09/14/12

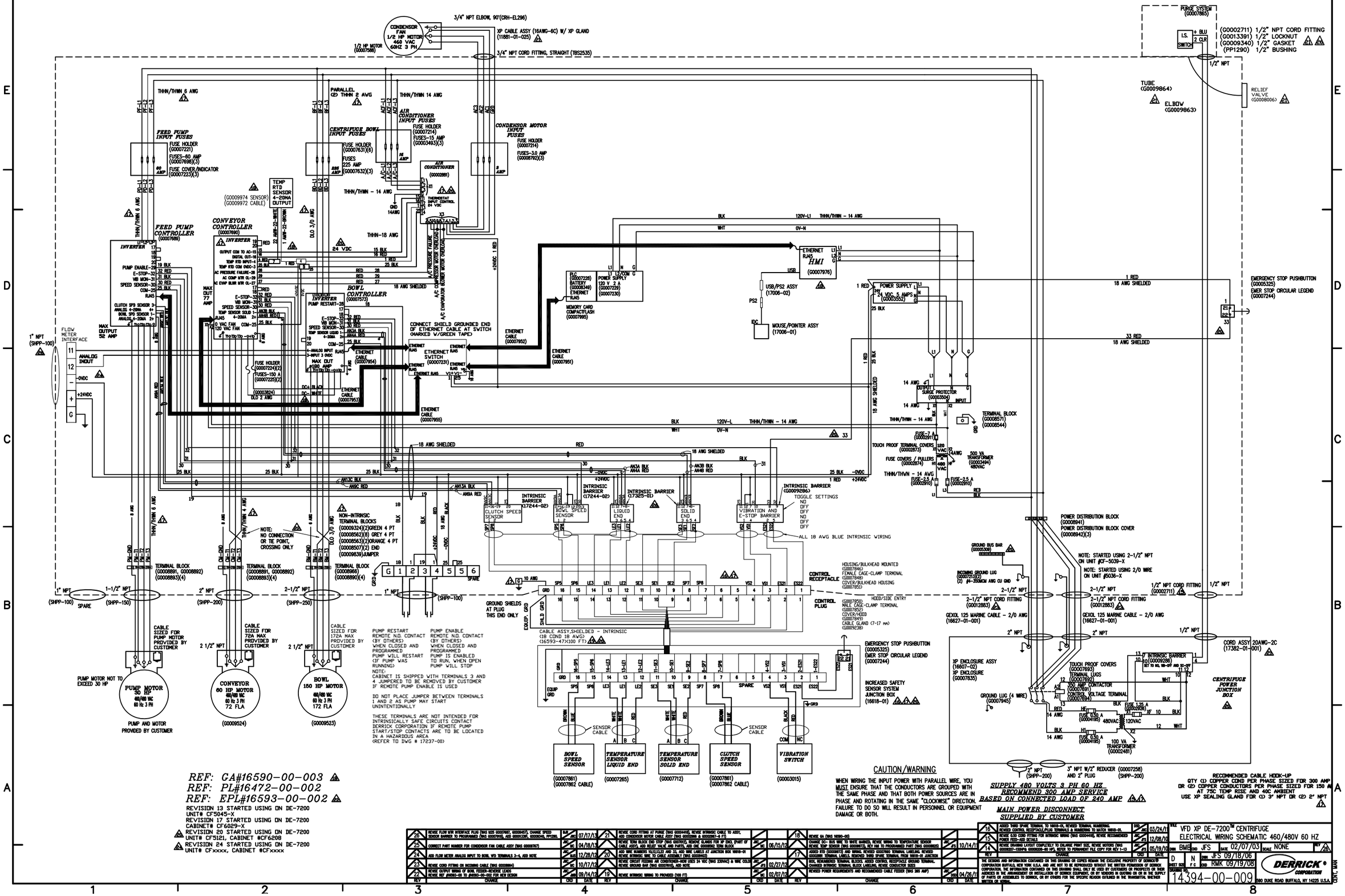
THE DESIGNS AND INFORMATION CONTAINED ON THIS DRAWING OR COPIES REMAIN THE EXCLUSIVE PROPERTY OF DERRICK® CORPORATION BUFFALO, NEW YORK U.S.A. AND ARE NOT TO BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF DERRICK CORPORATION. THE INFORMATION CONTAINED ON THIS DRAWING SHALL ONLY BE USED BY CUSTOMERS OR PROSPECTS OF THEIR AGENCIES IN THE ARRANGEMENT OF INSTALLATION OF DERRICK EQUIPMENT, OR BY VENDORS IN QUOTING OR OR IN THE SUPPLY OF PARTS OR ASSEMBLIES TO DERRICK, OR BY OTHERS FOR THE SPECIFIC REASON OUTLINED IN THE TRANSMITTAL WHETHER WRITTEN OR VERBAL.

TITLE: VFD NON-XP DE-7200™ CENTRIFUGE ELECTRICAL WIRING SCHEMATIC 460/480V 60 HZ

07/10/13 BMS CHD JFS DATE 02/07/03 SCALE NONE REV 15
09/14/12 DRN BMS CHD JFS DATE 02/07/03 SCALE NONE REV 14
DRN JFS 09/18/06
DIRECT SERV D N F C CHD
DRAWING NO. 14394-00-007

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CONT. MAN



REV	CHANGE	CKD	DATE
25	REVISE FLOW MTR INTERFACE PLUG (WAS 9025 G0007667, G0009457), CHANGE SPEED SENSOR BARRIER TO PROGRAMMED (WAS G0007916, ADD G0009388, G0009434, FP1295,	BJS	07/17/13
23	CORRECT PART NUMBER FOR CONDENSOR FAN CABLE ASSY (WAS G0008767)	MC	04/18/13
24	ADD FLOW METER ANALOG INPUT TO BOWL VFD TERMINALS 3-4, ADD NOTE	BJS	12/28/12
23	REVISE CORD FITTING ON INCOMING CABLE (WAS G0008864)	MC	10/17/12
22	REVISE OUTPUT WIRING OF BOWL FEEDER-REVERSE LEADS	BJS	09/14/12
21	REVISE REF #16593-00 TO #16593-00-002 FOR NEW DESIGN	BMB	08/14/12
21	REVISE CORD FITTING AT PURGE (WAS G0004495), REVISE INTRINSIC CABLE TO ASSY, ADD CONDENSOR MOTOR CABLE ASSY (WAS G0002894 & G0008967-1 FT)	BJS	02/27/12
20	REVISE TERM BLOCK END STOP (WAS G0007672), REMOVE GLANDS FOR XP ENCL (PART OF CABLE ASSY), ADD RELIEF VALVE AND PARTS, ADD ONE 1500X500 TERM BLOCK	MC	06/15/12
20	ADD WIRE NUMBERS TO(13)(12) AND 33, ADD WIRE LABELS AT JUNCTION BOX 16618-01	BJS	02/27/12
19	REVISE INTRINSIC WIRE TO CABLE ASSEMBLY (WAS G0009402)	BJS	02/07/12
19	REVISE CIRCUIT FEEDING AIR CONDITIONER-NOW USES 24 VAC (WAS 230VAC) & WIRE COLOR	BJS	02/27/12
19	REVISE GROUND BAR (WAS G0009310), ADD NOTE	BJS	02/07/12
19	REVISE INTRINSIC WIRING TO PROVIDED (100 FT)	BJS	02/07/12
18	REVISE 9A (WAS 16590-500)	BJS	04/26/11
18	CHANGE DC- BUS WIRE TO WHITE MARKED, REVISE WIRING TO TEMPERATURE SENSOR	BJS	10/14/11
17	REVISE TEMP SENSOR (WAS G0009373), REV #46 TO PROGRAMMED PART (WAS G0008950)	BJS	10/14/11
17	ADDED RTD (G0009972) AND TERMINAL REVISED G0007690 TERMINAL LABELING, REVISED G0009891 TERMINAL LABELS, REMOVED THIRD SPARE TERMINAL FROM 16618-01 JUNCTION BOX, RENUMBERED TERMINAL BLOCKS, ADDED CONTROL RECEPTACLE GROUND TERMINAL, CHANGED INTRINSIC TERMINAL BLOCK LABELING, REVISE CONDUCTOR SIZES	BJS	05/19/10
16	ADDED THIRD SPARE TERMINAL TO 16618-01, REVISED TERMINAL NUMBERING, REVISED CONTROL RECEPTACLE/PLUG TERMINALS & NUMBERING TO MATCH 16618-01,	BJS	03/24/11
15	REVISE ELEC CORD FITTING FOR INTRINSIC WIRING (WAS G0004495), REVISE RECOMMENDED POWER FEED-ADD DETAILS	BJS	12/08/10
14	REVISE DRAWING LAYOUT COMPLETELY TO ENLARGE PRINT SIZE, REVISE MOTORS (WAS G0008937-150HP)& G0008938-60 HP), REFER TO PERMANENT FILE COPY FOR REV 1-13	BMB	05/19/10
REV	CHANGE	CKD	DATE

THE DESIGNS AND INFORMATION CONTAINED ON THIS DRAWING OR COPIES REMAIN THE EXCLUSIVE PROPERTY OF DERRICK CORPORATION BUFFALO, NEW YORK U.S.A. AND ARE NOT TO BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF DERRICK CORPORATION. THE INFORMATION CONTAINED ON THIS DRAWING SHALL ONLY BE USED BY CUSTOMERS OR PROSPECTS OR THEIR AGENCIES IN THE ARRANGEMENT OF INSTALLATION OF DERRICK EQUIPMENT, OR BY VENDORS IN QUOTING OR OR IN THE SUPPLY OF PARTS OR ASSEMBLIES TO DERRICK, OR BY OTHERS FOR THE SPECIFIC REASON DEFINED IN THE TRANSMITTAL WHETHER WRITTEN OR VERBAL.

TITLE	VFD XP DE-7200™ CENTRIFUGE ELECTRICAL WIRING SCHEMATIC 460/480V 60 HZ
DWN	BMB 02/07/03
CKD	JFS 09/18/06
APP	RMK 09/19/08
SCALE	NONE
SHEET	1 OF 26
DRAWING NO.	14394-00-009
REVISION	D
SHEET SIZE	N
F/C	

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.
CBY, MAN

CONDENSOR FAN 1/2 HP MOTOR 380/400/415 VAC 50 HZ 3 PH (G0007588)

ELBOW 3/4" (CRH-EL29) NIPPLE 3/4" (NPLE-75-COND) 4

XP CABLE ASSY 16AWG-6C W/XP GLAND (G0009767) 4

3/4" NPT CORD FITTING, STRAIGHT (TBS2535)

PURGE SYSTEM (G0007865)

I.S. SWITCH + BLU 2 CLR

(G0002711) 1/2" NPT CORD FITTING
(G0013391) 1/2" LOCKNUT 4 4A
(G0009340) 1/2" GASKET
(PP1290) 1/2" BUSHING

1/2" NPT

TUBE (G0009864)

ELBOW (G0009863) 10

RELIEF VALVE (G0008006) 10

FEED PUMP INPUT FUSES
FUSE HOLDER (G0009477)
FUSES, 90 AMP (G0009476X3)

CENTRIFUGE CONVEYOR INPUT FUSES
FUSE HOLDER (G0009354)
FUSES-125 AMP (G0009930X3)

CENTRIFUGE BOWL INPUT FUSES
FUSE HOLDER (G0007631X6)
FUSES 250 AMP (G0009356X3)

AIR CONDITIONER INPUT FUSES
FUSE HOLDER (G0007214)
FUSES-15 AMP (G0003493X3)

CONDENSOR MOTOR INPUT FUSES
FUSE HOLDER (G0007214)
FUSES-3.0 AMP (G0008792X3)

(G0009974 SENSOR) (G0009972 CABLE)

TEMP RTD SENSOR 4-20MA OUTPUT

AIR CONDITIONER X1 (G0002881)

THERMOSTAT INPUT CONTROL 24 VDC

THHN-18 AWG

24 VDC

CONVEYOR CONTROLLER (G0009359)

FEED PUMP CONTROLLER (G0009360)

BOWL CONTROLLER (G0009358)

ETHERNET CABLE (G0007952)

PLC (G0007228) BATTERY (G0008349) ETHERNET RJ45 MEMORY CARD COMPACTFLASH (G0007995)

POWER SUPPLY 120 V 2 A (G0007229) (G0007230)

ETHERNET RJ45 HMI (G0007976)

USB/PS2 ASSY (17006-02)

MOUSE/POINTER ASSY (17006-01)

CONNECT SHIELD GROUNDED END OF ETHERNET CABLE AT SWITCH (MARKED W/GREEN TAPE)

ETHERNET SWITCH (G0007231)

ETHERNET CABLE (G0007954) (G0007955) (G0007795D)

POWER SUPPLY 24 VDC, 5 AMPS (G0003552)

EMERGENCY STOP PUSHBUTTON (G0005325)
EMER STOP CIRCULAR LEGEND (G0007244)

1 RED 1.0MM/18 AVG SHIELDED

33 RED 1.0MM/18 AVG SHIELDED

OUTPUT SURGE PROTECTOR (G0003594)

TERMINAL BLOCK (G0008571) (G0008544)

FUSE-7 A (G0002410)

TOUCH PROOF TERMINAL COVERS (G0003577)

FUSE COVERS / PULLERS (G0002674)

115VAC

500 VA CE TRANSFORMER (G0008080) 380VAC

FUSE-32 A (G0000165D)

MAX OUTPUT 85 AMP

MAX OUTPUT 56 AMP

DOUBLE DIODES (G0007227X2) (G0694-40-600)

FUSE HOLDER (G0007224X2)

FUSES-200 AMP (G0007207X2)

MAX OUTPUT 205 AMP (1103010D-040)

PUMP ENABLE-29 BLK
E-STOP-32 RED
VIB MON-31 BLK
SPEED SENSOR-30 RED
COM-25 BLK

CLUTCH SPD SENSOR ANALOG 4-20MA
BOWL SPD SENSOR ANALOG 4-20MA

ANSPA RED ANSPA BLK ANSPC RED ANSPC BLK

1.0MM/18 AVG SHIELDED (G0007696)

AN3A BLK AN4A RED AN3B BLK AN4B RED AN3C BLK AN4C RED AN9A BLK AN9B RED

INTRINSIC BARRIER (17244-02) CLUTCH SPEED SENSOR

INTRINSIC BARRIER (17244-02) BOWL SPEED SENSOR

INTRINSIC BARRIER (17325-01) LIQUID END

INTRINSIC BARRIER (17325-01) SOLID END

INTRINSIC BARRIER (G0009286) VIBRATION AND E-STOP BARRIER

TOGGLE SETTINGS
ND OFF
OFF OFF
ND OFF
OFF OFF

ALL 18 AVG BLUE INTRINSIC WIRING

NOTE: NO CONNECTION OR TIE POINT, CROSSING ONLY

NON-INTRINSIC TERMINAL BLOCKS (G0009324X2)GREEN 4 PT (G0008562X7) GREY 4 PT (G0008563X2)ORANGE 4 PT (G0008507X2) END

TERMINAL BLOCK (G0008891, G0008892) (G0008893X4)

TERMINAL BLOCK (G0008891, G0008892) (G0008893X4)

TERMINAL BLOCK (G0008966) (G0008904X4)

SPARE SPARE SPARE

1" NPT 1-1/2" NPT

1" NPT-M25 ADAPTER M25 PLUG (G0008449) (G0008813)

1-1/2" NPT/M40 ADAPTER (G0009197) (G0008807) PLUG

2" NPT 2-1/2" NPT

2" NPT/M50 (G0008451) ADAPTER (G0008455) PLUG

2-1/2" NPT/M63 ADAPTER (G0009467) (G0009466) PLUG

1" NPT-M25 ADAPTER M25 PLUG (G0008449) (G0008813)

FLOW METER INTERFACE

GROUND SHIELDS AT PLUG THIS END ONLY

CABLE SIZED FOR 42A MAX PROVIDED BY CUSTOMER

CABLE SIZED FOR 85A MAX PROVIDED BY CUSTOMER

CABLE SIZED FOR 205A MAX PROVIDED BY CUSTOMER

XP FITTING BY OTHERS

3" NPT/M50 (G0009752) M50 PLUG

3" NPT/M63 (G0009568) ADAPTER (G0009753) M63 PLUG

PUMP MOTOR NOT TO EXCEED 30 HP

PUMP MOTOR 30 HP 400 VAC 50 Hz 3 PH 42 FLA

PUMP AND MOTOR PROVIDED BY CUSTOMER

CONVEYOR MOTOR 60 HP 400 VAC 50 Hz 3 PH 85 FLA (G0009524)

BOWL MOTOR 150 HP 400 VAC 50 Hz 3 PH 205 FLA (G0009523)

PUMP RESTART REMOTE N.O. CONTACT (BY OTHERS) WHEN CLOSED AND PROGRAMMED PUMP WILL RESTART (IF PUMP WAS RUNNING)

PUMP ENABLE REMOTE N.O. CONTACT (BY OTHERS) WHEN CLOSED AND PROGRAMMED PUMP IS ENABLED TO RUN, WHEN OPEN PUMP WILL STOP

NOTE:
CABINET IS SHIPPED WITH TERMINALS 3 AND 4 JUMPERED TO BE REMOVED BY CUSTOMER IF REMOTE PUMP ENABLE IS USED

DO NOT PLACE JUMPER BETWEEN TERMINALS 1 AND 2 AS PUMP MAY START UNINTENTIONALLY

THESE TERMINALS ARE NOT INTENDED FOR INTRINSICALLY SAFE CIRCUITS CONTACT DERRICK CORPORATION IF REMOTE PUMP START/STOP CONTACTS ARE TO BE LOCATED IN A HAZARDOUS AREA (REFER TO DWG # 17237-00)

CABLE ASSY,SHIELDED - INTRINSIC (18 COND 18 AWG) (16593-47X100 FT)

CONTROL RECEPTACLE

HOUSING/BULKHEAD MOUNTED (G0007946) FEMALE CAGE-CLAMP TERMINAL (G0007948) COVER/BULKHEAD HOUSING (G0007850)

CONTROL PLUG

HOOD/SIDE ENTRY (G0007947) MALE CAGE-CLAMP TERMINAL (G0007950) COVER/HOOD (G0007849) CABLE GLAND (7-17 mm) (G0009238)

EMERGENCY STOP PUSHBUTTON (G0005325) EMER STOP CIRCULAR LEGEND (G0007244)

INCREASED SAFETY SENSOR SYSTEM JUNCTION BOX (16618-01) 3 4

SENSOR CABLE

BOWL SPEED SENSOR (G0007861) (G0007862 CABLE)

TEMPERATURE SENSOR LIQUID END (G0007265)

TEMPERATURE SENSOR SOLID END (G0007712)

CLUTCH SPEED SENSOR (G0007861) (G0007862 CABLE)

VIBRATION SWITCH (G0003015)

POWER DISTRIBUTION BLOCK (G0008941)
POWER DISTRIBUTION BLOCK COVER (G0008942X3)

GROUND BUS BAR (G0005309)

INCOMING GROUND LUG (G0007213X2) (2) #4-350MCM AWG CU GND

2-1/2" NPT CORD FITTING (G0012883)

GEXOL 125 MARINE CABLE - 2/0 AWG (16627-01-001)

1/2" NPT CORD FITTING (G0002711)

CORD ASSY 20AWG-2C (17382-01-001) 1A

XP ENCLOSURE ASSY (16607-01)
XP ENCLOSURE (G0007835)

TOUCH PROOF COVERS (G0007693)
TERMINAL LUGS (G0007692)
350 AMP CONTACTOR (G0007695)
CONTROL VOLTAGE TERMINAL (G0007694)
FUSE 125 A (G0002926)
FUSE 10 A (G0002996) 380VAC
FUSE 0.50 A (G0003996)
100 VA TRANSFORMER (G0002482)
129VAC

INTRINSIC BARRIER (G0009286)

GROUND LUG (4 WIRE) (G0007945)

CENTRIFUGE POWER JUNCTION BOX

2" NPT/M50 (G0008452) ADAPTER (G0008455) PLUG

3" NPT W/2" REDUCER (G0007258)

2" NPT/M50 (G0008452) ADAPTER (G0008455) PLUG

CAUTION/WARNING

WHEN WIRING THE INPUT POWER WITH PARALLEL WIRE, YOU MUST ENSURE THAT THE CONDUCTORS ARE GROUPED WITH THE SAME PHASE AND THAT BOTH POWER SOURCES ARE IN PHASE AND ROTATING IN THE SAME "CLOCKWISE" DIRECTION. FAILURE TO DO SO WILL RESULT IN PERSONNEL OR EQUIPMENT DAMAGE OR BOTH.

SUPPLY 380/400 VOLTS 3 PH 60 HZ
RECOMEND 400 AMP SERVICE
BASED ON CONNECTED LOAD OF 290 AMP 4A

MAIN POWER DISCONNECT SUPPLIED BY CUSTOMER

RECOMMENDED CABLE HOOK-UP SIZED FOR 400 AMP (2) COPPER CONDUCTORS PER PHASE SIZED FOR 200 AMP AT 75C TEMP RISE AND 40C AMBIENT USE XP SEALING GLAND FOR (2) 2" NPT/M50 4

REVISION 4 STARTED USING ON DE-1000 UNIT# CF5067 4

REVISION 8 STARTED USING ON DE-1000 UNIT# CFxxxx 4

REF: CA#16590-00-003 1
REF: PL#16472-00-003
REF: EPL#16593-00-002 1

REV	CHANGE	CKD	DATE
13	ADD FLOW METER INTERFACE, ADD G0013284, G0008340, PP1290, REVISE INTRINSIC BARRIER (BIS G0007949)	JFS	07/15/13
12	REVISE CORD FITTING ON INCOMING CABLE (BIS G0008894)	JFS	10/17/12
11	REVISE OUTPUT WIRING OF BOWL FEEDER-REVERSE LEADS REVISE REF (#4060-01 TO #4060-01-002 FOR NEW DESIGN	JFS	09/14/12
10	NON-INTRINSIC TERMINAL BLOCK END (BIS G0007212)ADD WIRE BUS 32 RED ADD RELIEF VALVE AND PARTS, ADD GROUND TERMINAL AT SURGE PROTECTOR		
9	REVISE INTRINSIC WIRE TO CORD ASSEMBLY (BIS G0007958 & G0004444)	DMB	07/22/12
8	REVISE CONNECTION MOTOR CABEL TO ASSY (BIS G0002898 & G0002977), CORRECT ERROR ON BOWL FEEDER ADAPTER (BIS 2"), REVISE TB END (BIS G0007912)CLAMP PUMP FITTINGS	JFS	06/19/12
7	ADD WIRE NUMBERS 4, 32 AND 33, ADD WIRE LABELS AT JUNCTION BOX 16618-01 REVISE INTRINSIC WIRE TO CABLE ASSEMBLY (BIS G0004443), ADD TO TELE BLK "45N"	JFS	02/27/12
6	REVISE CIRCUIT FEEDING AIR CONDITION-MOW USES 240VC (BIS 230 VAC) & WIRE COLOR REVISE GROUND BAR (BIS G0007950), ADD WIRE		
5	REVISE 6A (BIS 16590-00)		
4	CHANGE DC- WIRE TO MARKED WHITE /BTWEE WIRING TO TEMPERATURE SENSOR, REVISE TEMPERATURE SENSOR (BIS G0008915), REV 16B TO PROGRAMMED PART (BIS G0008925)	JFS	10/11/11
3	ADDED THIRD SPARE TERMINAL IN 16618-01 JUNCTION BOX, RENUMBERED WIRING TERMINALS, REVISED TERMINALS & NUMBERING ON CONTROL RECEPTACLE/PLUG TO MATCH 16618-01,	DJD	03/25/11
2	REVISE 0.5 CORD FITTING FOR INTRINSIC WIRING (BIS G0004418), REVISE RECOMMENDED POWER FEED-WIRE DETAIL	JFS	12/08/10
1	REVISE NEW STOPPING PLUGS (BIS G0008457), REVISE 2-1/2" ADAPTER AT 60 HP MOTOR TO 3" ADAPTER (BIS G0009466) & PLUG (BIS G0009465), & M63 PLUG (BIS G0009465)	JFS	09/09/10
REV	CHANGE	CKD	DATE

REV	CHANGE	CKD	DATE
6	REVISE WIRE FEEDING LINE FUSE FOR CONVEYOR DRIVE (BIS DLO 4/0)	JFS	09/30/11
5	UNIT METRIC REDUCER (BIS G0008893) AT CONDENSOR MOTOR AND ADD NEW FITTINGS	JFS	09/28/11
4	ADDED RTD (G0009975) AND WIRING, REVISED G0009359 TERMINAL LABELING, REVISED G0002898 TERMINAL LABELS, REMOVED THIRD SPARE TERMINAL FROM 16618-01 JUNCTION		
3	BOX, RENUMBERED TERMINALS, ADDED INTRINSIC CONTROL RECEPTACLE GROUND TERMINAL, REVISED RECOMMENDED CABLE SIZE (BIS 330 AMP), REVISE CONNECTOR SIZES		
2	(BIS DLO, 1/0 AWG/90AA, CONV 4AWG/49AA, PUMP 8AWG/70AA)	JFS	09/12/11

REV	CHANGE	CKD	DATE

VFD XP DE-7200™ CENTRIFUGE
ELECTRICAL WIRING SCHEMATIC 380/400/415V 50 HZ

SHEET SIZE D | SCALE NONE | REV 13

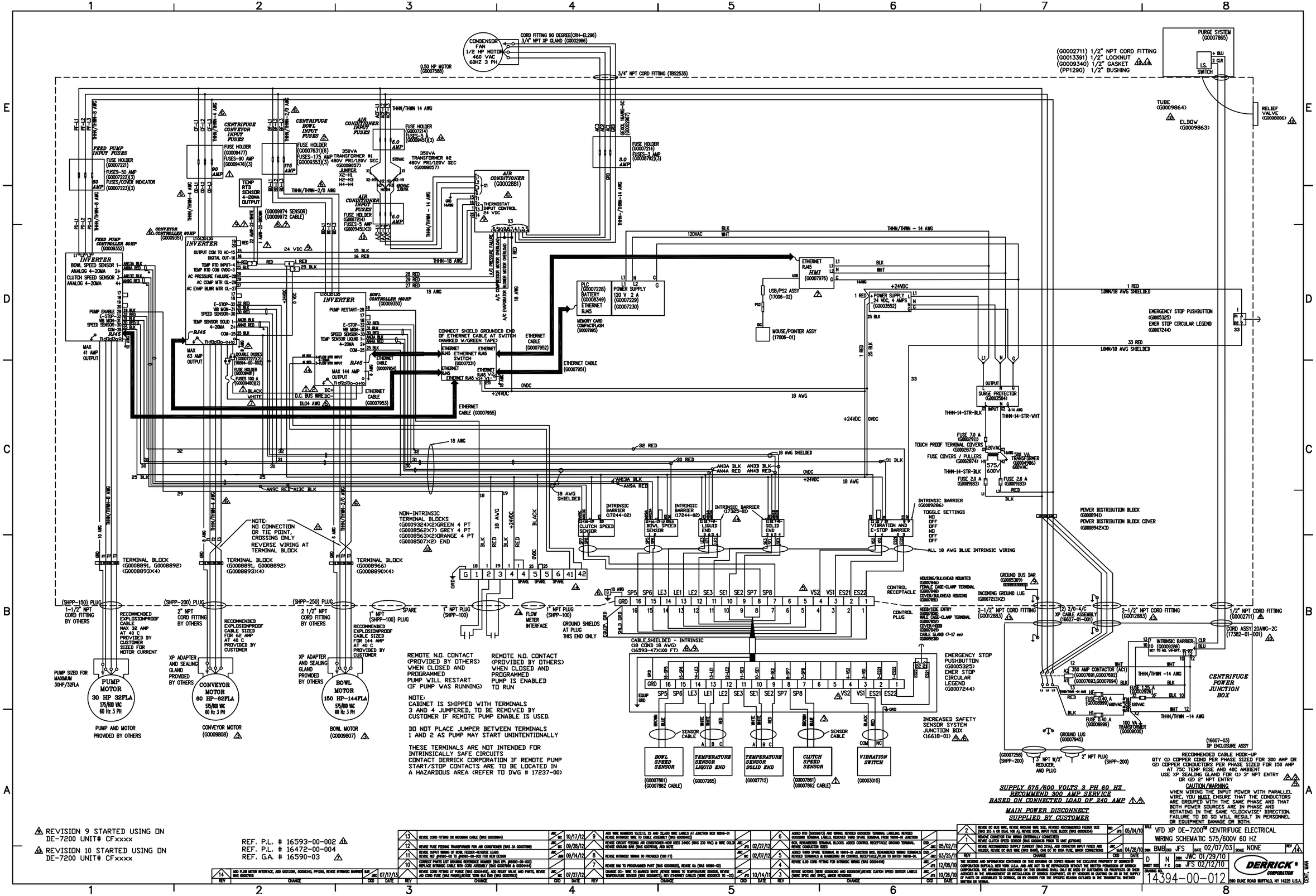
DRAWN BMB CKD JFS DATE 02/07/03

CKD JWC 05/06/10 DMB

DRAWING NO. 14394-00-011

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CSH, MAN



REVISION 9 STARTED USING ON DE-7200 UNIT# CFxxxx

REVISION 10 STARTED USING ON DE-7200 UNIT# CFxxxx

REF. P.L. # 16593-00-002
REF. P.L. # 16472-00-004
REF. G.A. # 16590-03

REV	CHANGE	DRN	DATE
14	ADD FLOW METER INTERFACE, ADD G0003384, G0009340, PP1293, REVISE INTRINSIC BARRIER SUB. NAS G0007918	JFS	07/17/13
13	REVISE CORD FITTING ON INCOMING CABLE (WAS G0000894)	MC	10/17/12
12	REVISE FUSE FEEDING TRANSFORMER FOR AIR CONDITIONER (WAS 3A G0007898)	MC	09/28/12
11	REVISE INPUT WIRING OF BOWL FEEDER-REVERSE LEADS REVISE REF (H0060-03 TO (H0060-02-002 FOR NEW DESIGN	MC AMB	09/14/12
10	CORRECT PARTS LIST GROUNDING REFERENCE NUMBER (WAS DIFF. (H0060-02-002) REPLACE INTRINSIC CABLE WITH CORD ASSEMBLY (WAS G0007918 & G0004444)		
9	REVISE CORD FITTING AT PURGE (WAS G0004468), ADD RELIEF VALVE AND PARTS, REVISE AIR COND FUSE (WAS FNQR25),REVISE TERM BLK DIA (WAS G0007912)	MC JFS	07/27/12
8	ADD WIRE NUMBERS 10,12,13, 22 AND 32,ADD WIRE LABELS AT JUNCTION BOX H0018-01 REVISE INTRINSIC WIRE TO CABLE ASSEMBLY (WAS G0009452)	MC	02/27/12
7	REVISE CIRCUIT FEEDING AIR CONDITIONER-NOW USES 3#4DC (WAS 230 VAC) & WIRE COLOR REVISE GROUND BAR (WAS G0009940), ADD NOTE	MC JFS	02/07/12
6	REVISE INTRINSIC WIRING TO PROVIDED (100 FT)	MC	02/07/12
5	REVISE THIS TO PROGRAMMED PART (WAS G0000825), REVISE 6A (WAS H0060-00)	JFS	12/08/10
4	CHANGE DC- WIRE TO MARKED WHITE,REVISE WIRING TO TEMPERATURE SENSOR, REVISE TEMPERATURE SENSOR (WAS G0008907), REV ETHERNET CABLES (WERE G0008251 TO -23)	JFS	10/14/11
3	REVISE MOTORS (WERE G0006350 AND G0006391),REVISE CLUTCH SPEED SENSOR LABELS (WERE SPDS AND SPDC), MINOR REVISIONS	JFS	10/26/10
2	REVISE DC BUS WIRE, REVISE GROUND WIRE SIZE, REVISED RECOMMENDED FEEDER SIZE (WAS 2/0 4 OR DUAL 500 A), REVISE BOWL INPUT FUSE BLOCK (WAS G0008854)	MC JFS	05/04/10
1	REMOVE CONVEYOR FAN WIRING INTERNALLY CONNECTED REVISE CLUTCH SPEED SENSOR (WAS G0008439 PRIOR TO UNIT #CF0640)		
REV	REVISE RECOMMENDED SUPPLY CURRENT (WAS 210A), ADD CONVEYOR INPUT FUSES AND HOLDER, REVISE DC BUS WIRE (WAS THW), CHG DC TO 100A FUSE, MINOR CORRECTIONS CHANGE	SUB DRN CHD	04/28/10 05/05/11 DATE

DRN	BMB 02/07/03
CHD	JFS NONE
DRN	JWC 01/29/10
CHD	JFS 02/12/10

VFD XP DE-7200™ CENTRIFUGE ELECTRICAL WIRING SCHEMATIC 575/600V 60 HZ

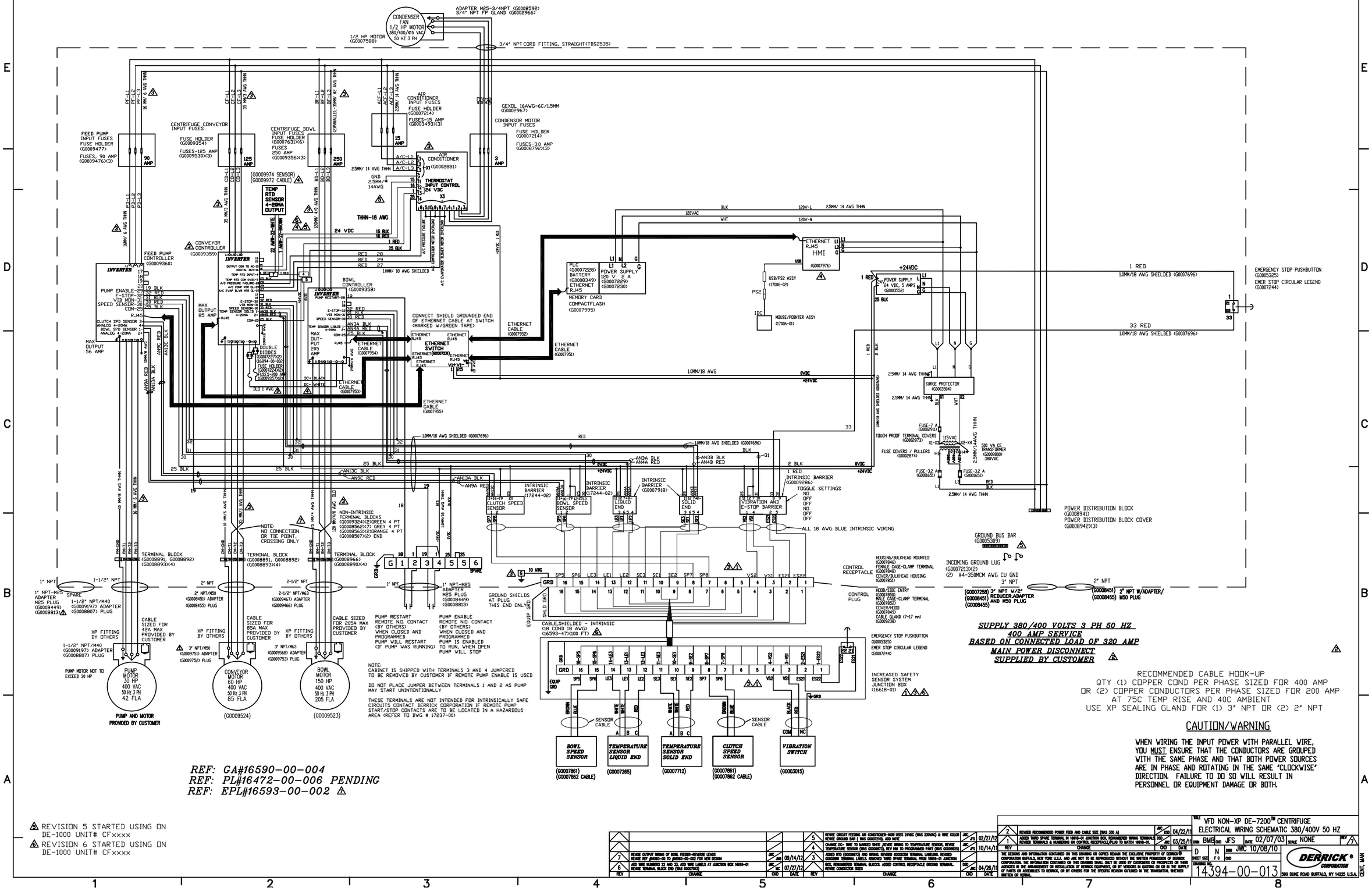
SCALE: NONE REV: 14

SHEET SIZE: D FC N

DRAWING NO. 14394-00-012

DERRICK® CORPORATION 590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CONT. MAN



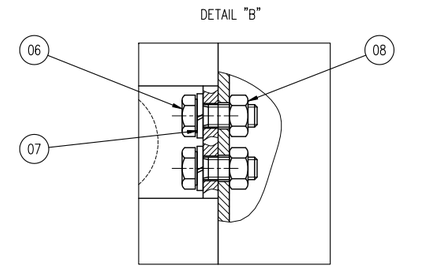
5 REVISION 5 STARTED USING ON DE-1000 UNIT# CFxxxx

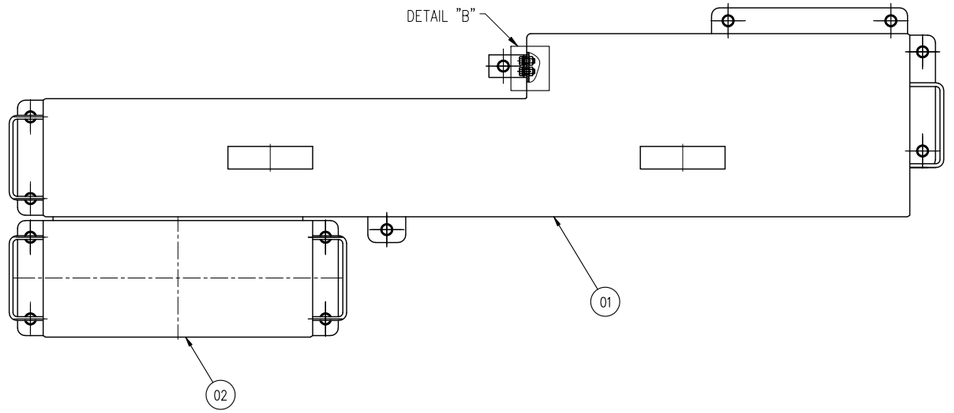
6 REVISION 6 STARTED USING ON DE-1000 UNIT# CFxxxx

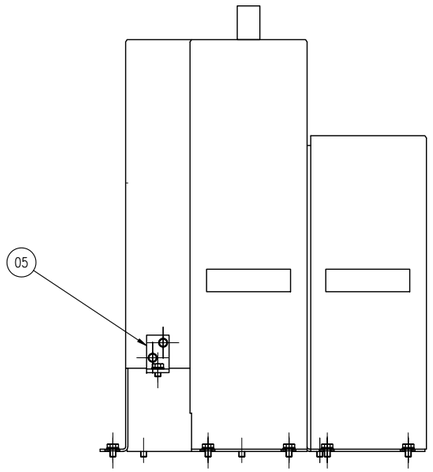
REV	CHANGE	CHD	DATE
7	REVISE OUTPUT WIRING OF BOWL FEEDER-REVERSE LEADS REVISE REF #16593-00 TO #16593-00-005 FOR NEW DESIGN	JMC JMB	09/14/12
6	ADD WIRE NUMBERS 22 AND 33, ADD WIRE LABELS AT JUNCTION BOX 16618-01 REVISE TERMINAL BLOCK END (DNS G0007702)	JMC MC	07/27/12
5	REVISE CIRCUIT FEEDING AIR CONDITIONER-NOW USES 24VDC (WAS 230VAC) & WIRE COLOR REVISE GROUND BAR (WAS G0007230), ADD NOTE	JMC JFS	02/27/12
4	CHANGE DC- WIRE TO MARKED WHITE .REVISE WIRING TO TEMPERATURE SENSOR, REVISE TEMPERATURE SENSOR (WAS G0006972), REV #00 TO PROGRAMMED PART (WAS G0008260)	JMC JFS	10/14/11
3	ADDED RTD (G0009975) AND WIRING, REVISED G0009359 TERMINAL LABELING, REVISED G0008891 TERMINAL LABELS, REMOVED THIRD SPARE TERMINAL FROM 16618-01 JUNCTION BOX, REMUMBERED TERMINAL BLOCKS, ADDED CONTROL RECEPTACLE GROUND TERMINAL. REVISE CONDUCTOR SIZES	DSD JMC	04/26/11
2	REVISED RECOMMENDED POWER FEED AND CABLE SIZE (WAS 230 A)	JMC DSD	04/22/11
1	ADDED THIRD SPARE TERMINAL M 16618-01 JUNCTION BOX, REMUMBERED WIRING TERMINALS REVISED TERMINALS & NUMBERING ON CONTROL RECEPTACLE/PLUG TO MATCH 16618-01.	DSD JMC	03/25/11
REV	CHANGE	CHD	DATE

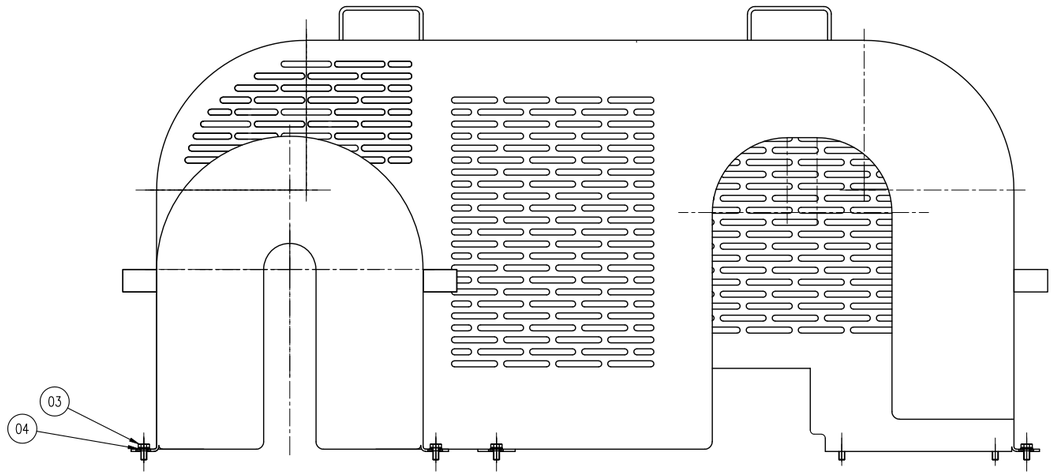
TITLE	VFD NON-XP DE-7200™ CENTRIFUGE ELECTRICAL WIRING SCHEMATIC 380/400V 50 HZ
DRN	BMB
CHD	JFS
DATE	02/07/03
SCALE	NONE
REV	7
SHEET SIZE	D
DRAWING NO.	14394-00-013

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.









		QTY	ITEM	PART NUMBER	DESCRIPTION/PART NAME
1		09	G0012504		BELT GAURD ASSEMBLY
		2	08	G0007860	HEX NUT
2		2	07	G0008101	LOCK WASHER
		2	06	G0012416	HEX HEAD BOLT
		1	05	G0007857	MOUNTING ANGLE
1		12	04	G0012501	FLAT WASHER
		12	03	G0007756	HEX HEAD BOLT
		1	02	G0012415	SHAFT GUARD
1		1	01	G0012414	BELT GUARD

REF GA: 16590-00-003
REF GA: 16590-00-004
REF GA: 16590-00-005
REF GA: 16590-00-006

NOTE:
USE WITH UNITS CF005036 - CURRENT

REV	CHANGE	CKD	DATE
2	CHANGED ITEM 07 (WAS G0007859)	JMB	4/25/12
1	ITEM 01, ADDED PART NUMBER; ITEM 04, CHANGED PART NUMBER TO G0012501, WAS G0007850; ADDED ITEM 09; UPDATED BALLOONS	JMB SB	2/13/12

TITLE: BELT GUARD PARTS LIST
DE-7200 CENTRIFUGE

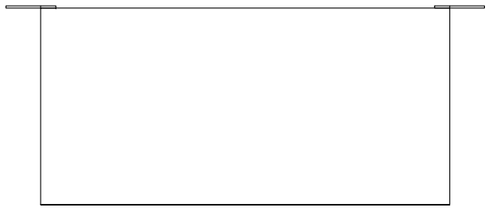
DWN CCS | CKD | DATE 1/31/07 | SCALE NTS | REV 2

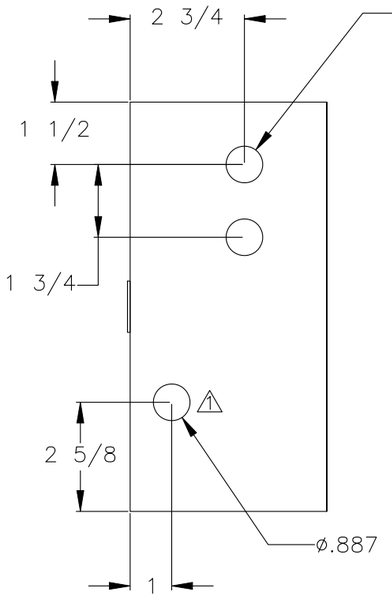
C | Y | DWN JMB 12/7/11 | F C | CKD

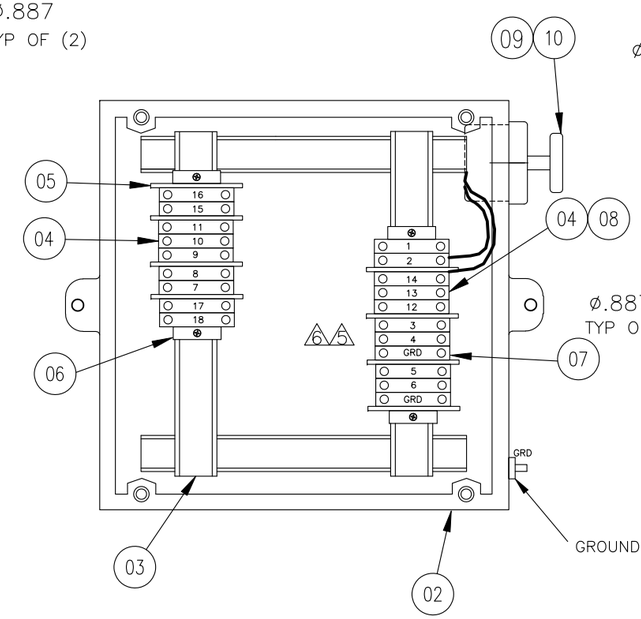
SHEET SIZE | DRAWING NO. 16605-00-001

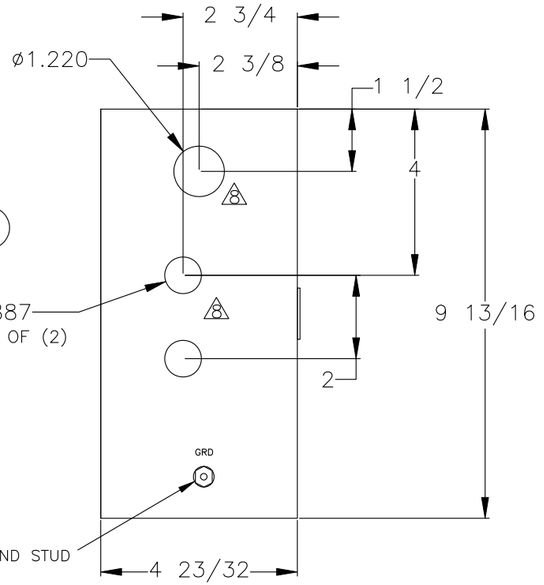
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

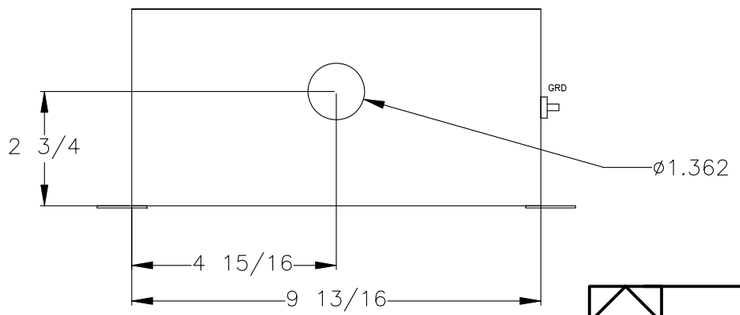
CENT, MAN











QTY	ITEM	PART NUMBER	PART NAME	DESCRIPTION
1	10	G0007244	NAMEPLATE, EMERGENCY STOP	
1	09	G0005325	EMERGENCY STOP BUTTON	
1	08	CUSTOM	TERMINAL BLOCK LABEL	
2	07	G0008571	TERMINAL BLOCK GROUND	BLOCK, TERM GND-2 COND GRN/YEL
4	06	G0004286	TERMINAL BLOCK END CLAMP	CLAMP, TERM BLOCK 10MM
8	05	G0008544	TERMINAL BLOCK DIVIDER	SEPARATOR, TERM BLK-2002 SERIES/ORANGE
18	04	G0008572	TERMINAL BLOCK	BLOCK, TERM-2 COND THRU 2002 SERIES/BLUE
2	03	G0003567	RAIL	RAIL, DIN-35mm X 7.5mm X 8.5
1	02	G0004278	ENCLOSURE	ENCLOSURE, SS-9.84X9.84X4.73 NEMA 4X
	01	16618-01	PARTS LIST FOR ENCLOSURE	ASSEMBLY COMPLETE

REF WS 14394-00-007
REF WS 14394-00-009
REF WS 14394-00-011
REF WS 14394-00-012
REF WS 14394-00-013
REF WS 14394-00-025
REF PL 16593-00
REF PL 16593-00-002
REF PL 16593-00-003

REV	CHANGE	CKD	DATE
8	REFER TO MODEL SPACE FOR REVISIONS 1 TO 7, OMIT HOLE ON TOP OF BOX FOR E-STOP ADD E-STOP TO RIGHT SIDE, MOVE TWO CONDUIT HOLES ON RIGHT SIDE DOWN ONE INCH	JWC MC	01/29/13

TITLE
DE-7200 BASE
JUNCTION BOX ASSEMBLY

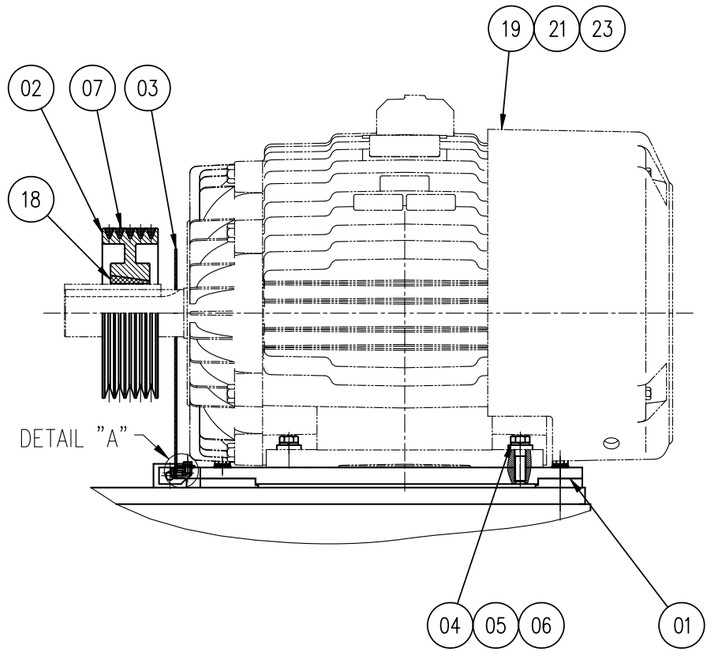
DWN JWC | CKD JFS | DATE 02/20/07 | SCALE NTS | REV 8

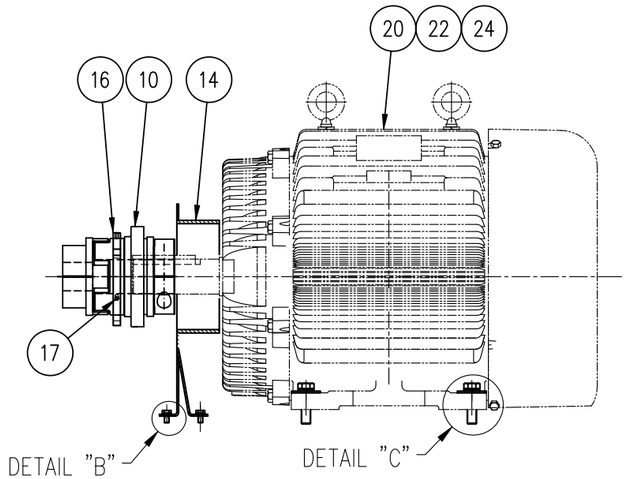
SHEET SIZE B | F C N | DWN | CKD

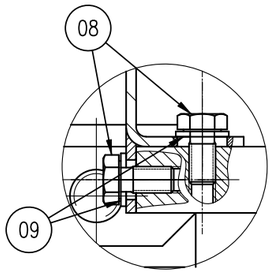
DRAWING NO. 16618-00

DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

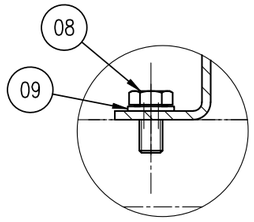
PUR,CENT,MAN
TT



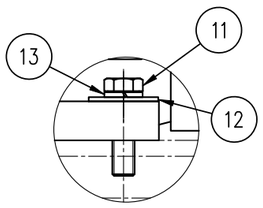




DETAIL "A"



DETAIL "B"



DETAIL "C"

			27	16621-27	575V DRIVE ASSEMBLY
			26	16621-26	460V DRIVE ASSEMBLY
			25	16621-25	380V DRIVE ASSEMBLY
1			24	G0009391	MOTOR, 575V 60Hp
1			23	G0009390	MOTOR, 575V 150Hp
	1		22	G0009208	MOTOR, 460V 60Hp
	1		21	G0009207	MOTOR, 460V 150Hp
		1	20	G0009524	MOTOR, 380V 60Hp
		1	19	G0009523	MOTOR, 380V 150Hp
1	1	1	18	G0009297	PULLEY BUSHING
			17		
			16		
			15		
1	1	1	14	G0007968	BACK DRIVE SHAFT GAURD
4	4	4	13	G0012129	LOCK WASHER
4	4	4	12	G0007967	FLAT WASHER
4	4	4	11	G0012130	HEX HEAD BOLT
1	1	1	10	G0008994	OVERLOAD CLUTCH/COUPLING
6	6	6	09	G0012501	FLAT WASHER
6	6	6	08	G0007756	HEX HEAD BOLT
5	5	5	07	G0007964	DRIVE BELT
4	4	4	06	G0003352	LOCK WASHER
4	4	4	05	G0007962	FLAT WASHER
4	4	4	04	G0007961	HEX HEAD BOLT
1	1	1	03	G0007960	MAIN DRIVE SHAFT GUARD
1	1	1	02	G0009296	V-BELT PULLEY
1	1	1	01	G0007957	MOTOR PLATE
QUANTITY			ITEM	PART NUMBER	DESCRIPTION/PART NAME

NOTE:
USE WITH UNITS CF005001 – CF005035

REF: 16590-00-005

REV			
9	CHANGED QUANTITIES FOR ITEMS 08 (WAS 3) AND 09 (WAS 3). ADDED ITEM 14. REMOVED ITEMS 16 AND 17. ADDED DETAIL B. CHANGED ITEMS 11 (WAS G0007966) AND 13 (WAS G0007734).	JMB	7/18/12
8	MODIFIED ITEM 16 (WAS 16669-01-001)	JMB	7/18/12
7	REMOVED DETAIL "B", REMOVED ITEM 14 (WAS G0007968), ITEMS 08 & 09 QTY WAS 6, CHANGED ITEM 06 (WAS G0007963), ADDED ITEMS 19-27.	JMB / SB	2/14/12
6	REMOVED ITEM 15, WAS G0007756; REMOVED ITEM 19, WAS G0007873; QUANTITY OF ITEM 08 WAS 3	JMB	12/22/11
5	ITEM 09 WAS G0007965 QTY 3, ITEM 16 WAS G0007969 QTY 3; MODIFIED BOM & BALOONS TO REFLECT CHANGES.	MCR / SB	10/24/11
4	ADDED ITEM 20; ADDED CUT VIEW OF PULLEY; 16590-00-003 WAS 16590-00	JMB	8/31/11
3	ITEM 02 WAS G0007958; ADDED ITEM 19.	CCS	7/22/2010
2	ADDED ITEMS 17 & 18.	CCS	3/1/2010
1	ITEM 10 WAS G0007870.	CCS	2/9/2010

TITLE: MOTORS AND MECHANICAL DRIVE COMPONENTS PARTS LIST FOR DE-7200 CENTRIFUGE

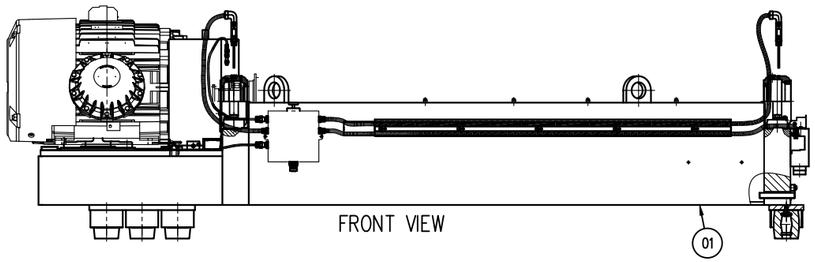
DWN CCS | CKD | DATE 2/27/07 | SCALE NTS | REV 9

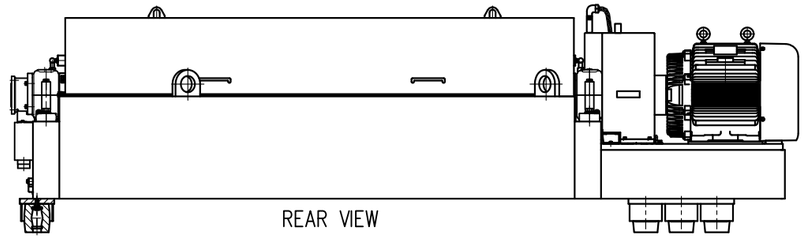
SHEET SIZE B | N | DWN | CKD

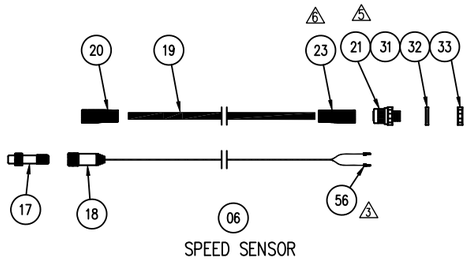
DRAWING NO. 16621-00

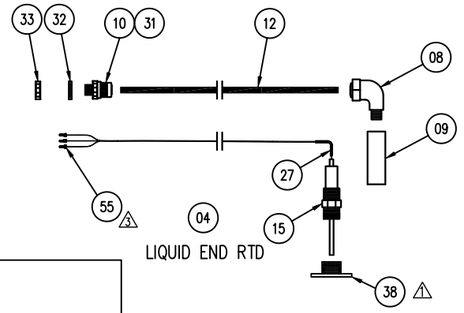
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

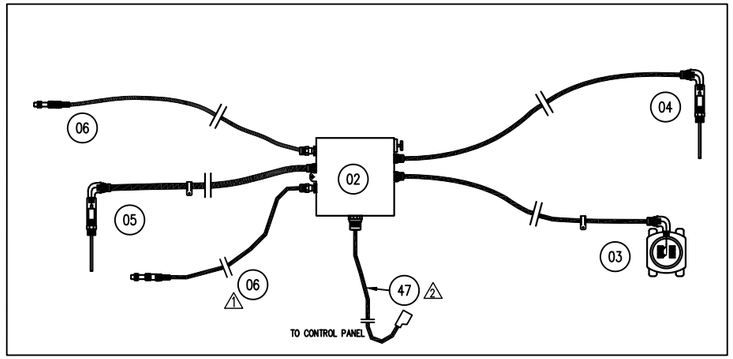
CENT, MAN

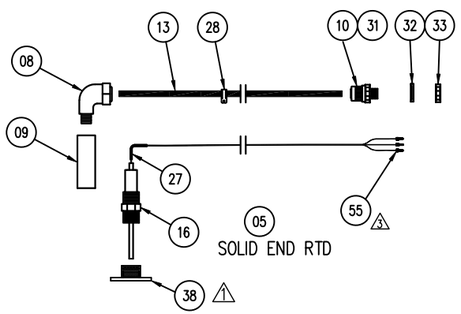


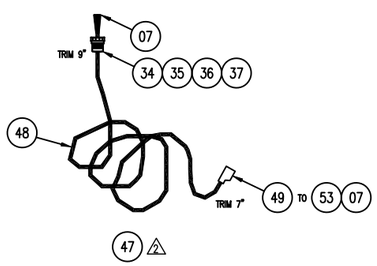


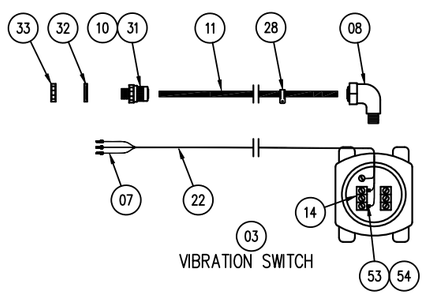












						ITEM	PART NAME	PART NUMBER
	2					56	FERRULE,WIRE-24AWG YEL	G0008931
		3	3			55	FERRULE,WIRE-26AWG GRAY 6MM	G0012492
				2		54	RING TERMINAL 18AWG #6 STUD	G0012798
2				1		53	RING TERMINAL 18AWG #8 STUD	G0012802
1						52	MALE TERMINAL-CAGE CLAMP	G0007852
1						51	HOOD SIDE ENTRY	G0007850
1						50	PLUG HOOD COVER	G0007849
1						49	CABLE GLAND (7-17 MM)	G0009238
1						48	INTRINSIC CABLE 18AWG 18 COND (100 FT)	G0008403
					1	47	INTRINSIC CABLE ASSEMBLY	16593-47-002
						46	NOT USED	
						45	NOT USED	
						44	NOT USED	
						43	NOT USED	
						42	NOT USED	
						41	NOT USED	
						40	NOT USED	
						39	NOT USED	
		1	1			38	TEMPERATURE SENSOR MOUNTING BRACKET	17213-01
1						37	LOCKNUT, COND 1.0 STAINLESS STEEL	G0013393
1						36	SEALING GASKET 1.0	G0007699
1						35	BUSHING, INSULATED 1.0	G0009046
1						34	CORD CONNECTOR 1.0 NPT (0.50-0.635)	G0009236
	1	1	1	1		33	LOCKNUT, COND 0.50 STAINLESS STEEL	G0013391
	1	1	1	1		32	SEALING GASKET 0.50	G0009340
	1	1	1	1		31	INSULATED BUSHING 0.50	PP1290
						30	LOCKNUT, BRASS 0.50 NPT-NPT	G0008725
						29	SPACER	16659-01-001
		1		1		28	CLAMP, CUSHION - 0.750" NPT, 0.406" MOUNTING	G0008027
		1	1			27	SLEEVE,#8-SILICONE RUBBER 6" LENGTH	G0008035
						26	NOT USED	
						25	NOT USED	
						24	NOT USED	
1						23	HEAT SHRINK TUBING, 0.51 X 2"	G0007940
				1		22	WIRE, 4 COND 18 AWG SHIELDED X 125"	G0012954
1						21	FITTING,CORD-.500 NPT X .250-.375 DIA	G0004418
1						20	HEAT SHRINK TUBING, 0.75"x 2"	G0007266
1						19	ARMOR JACKET, .218 ID X 46" W/BRASS FERRULES	G0012810
1						18	CABLE, SPEED SENSOR, WITH FITTING, 2 M LONG	G0007862
1						17	SPEED SENSOR	G0007861
		1				16	RTD SENSOR, BEARING, 5" 316SS 60" WIRE	G0007712
			1			15	RTD SENSOR, BEARING, 5" 316SS 140" WIRE	G0007265
				1		14	VIBRATION SWITCH	G0003015
		1				13	CONDUIT, LIQUID TIGHT - 1/2" X 37"	G0007938
			1			12	CONDUIT, LIQUID TIGHT - 1/2" X 122"	G0007937
				1		11	CONDUIT, LIQUID TIGHT - 1/2" X 103"	G0007936
			1	1	1	10	FITTING, LIQUID TIGHT, 1/2" NPT, STRAIGHT	CRH-LT50
			1	1		09	COUPLING, PIPE - FULL, 1/2" NPT, SS	CPLG-50-S4
			1	1	1	08	90 DEGREE ELBOW, LIQUID TIGHT	G0012613
35				3		07	FERRULE 18AWG X 6MM L RED	G0003538
					2	06	SPEED SENSOR ASSY-BOWL & CONVEYOR MOTOR	16593-06-002
					1	05	SOLID END RTD ASSY	16593-05-002
					1	04	LIQUID END RTD ASSY	16593-04-002
					1	03	VIBRATION SWITCH ASSY	16593-03-002
					1	02	JUNCTION BOX, SENSOR ELECTRONICS ASSY	16618-01
						01	DE-7200 ROTATING ASSY ELECTICAL COMPONENT KIT	G0012797
QTY						ITEM	PART NAME	PART NUMBER

REF: W.S. #14394-00-007
REF: W.S. #14394-00-009 ⚠2
REF: W.S. #14394-00-011
REF: W.S. #14394-00-012
REF: W.S. #14394-00-013
REF: W.S. #14394-00-020

DE-7200 UNIT #CF5058-CURRENT

REV	CHANGE	CKD	DATE
9	REVISE ITEM 13 WAS 38" NOW 37"	JWC MC	03/22/13
8	REVISE ITEMS 33 AND 37 (WERE G0008575 & TBS-143) PLUS 32 & 36(WERE G0008574 & G0009047), REVISE LOCATION OF EMERGENCY STOP BUTTON	JWC MC	03/18/13
7	REVISE ITEM 22 (WAS G0007941)	JWC MC	12/28/12
6	REVISE QTY 7 PART NUMBER ITEM 20 (WAS 2 AND G0007940), ADD NEW ITEM 23 (WAS NOT USED)	JWC MC	11/12/12
5	OMIT ITEM 25 AND 26 SEALING GASKET AND LOCKNUT (WERE G0007993 & G0007994) REVISE ITEM 21 FROM CLAND TO CORD GRIP (WAS G0004444)		
	REVISE ITEM 10 TO NEW VERSION ARMOR (WAS G0007939), REVISE QTY OF ITEMS 32 & 33 FOR ITEM 06-REVISE QTY ITEM 20 (WAS 1)	JWC JMB	09/13/12

REV	CHANGE	CKD	DATE
4	CHANGED PART NUMBERS ON ITEMS 01 (WAS G0007702), 03 (WAS 16593-03), 04 (WAS 16593-04), 05 (WAS 16593-05), 06 (WAS 16593-06), 47 (WAS 16593-47), 53 (WAS BLANK) AND 54 (WAS BLANK).	JMB	9/6/12
3	REVISE 07 (WAS G0002377), REVISE ITEM 53 (WAS G0003538-NOW ITEM 07), REVISE 54 (WAS FORK TERM), ADD 55 & 56, REVISE ITEM 08 (WAS CRH-LT5080)	JWC MC	06/12/12
2	REVISE TITLE BLOCK WORDING (WAS BASE SENSOR SYSTEM), ADD ITEMS 47-54, REVISE DISTRIBUTION LIST (WAS CENT,GER,MAN), REVISE 01 DESCRIPTION (WAS "BASE ELECTRICAL")		
	DELETE ITEM 45 (SPEED SENSOR ASSY) REPLACED BY IDENTICAL ITEM 06, OMIT ITEM 46 (WAS ARMOR JACKET), OMIT MOTORS ITEMS 23,24,41,42,43 AND 44 (SHOWN ON 16621-00)		
	OMIT ITEMS 39 AND 40 (NEW COMPONENT KITS AT 380V & 575V) ONLY ONE KIT REQUIRED USE ITEM 01 FOR ALL VOLTAGES, ADD NS REFERENCES	JWC JFS	02/15/12

REV	CHANGE	CKD	DATE
1	ADD ITEMS 38 TO 46, OMIT ONE ITEM 06, ADD SECOND VIEW OF ROTATING ASSEMBLY, CHANGE QTY OF ITEMS 29 AND 30 (WAS COLUMN 04-1 AND 3)	JWC JFS	11/02/10
0	THIS DRAWING WAS CREATED 8-20-12 BY COPYING 16593-00 FROM REV 9 AND LATER OLD 16593-00 REV 9, 10 AND 11 ARE NOW 16593-00-002 REV 1 , 2 AND 3		
	THE CHANGE CORRESPONDS WITH THE DESIGN CHANGE TO THE DE-7200	JMB JWC	08/20/12

TITLE: ELECTRICAL PARTS LIST FOR DE-7200 CENTRIFUGE INTRINSIC WIRING SYSTEM NEW DESIGN

DWN MS | CKD JFS | DATE 02/14/07 | SCALE NONE | REV 9

SHEET SIZE C | N | DWN JMB 08/20/12 | F C | CKD JWC 09/13/12

DRAWING NO. 16593-00-002

DERRICK® CORPORATION 590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

CENT,BOM,MAN

QTY	ITEM	PART NUMBER	DESCRIPTION
3	13	G0008184	BOLT – USE WITH COMBINATION PLATE
3	12	G0008183	COMBINATION PLATE – HOLDS CONVEYOR TO BOWL
1	11	G0008815	TAPER PIN REAMER
1	10	16748–01	FEED & SOLID DISCHARGE REPLACEMENT TOOL
2	09	G0008718	EYE BOLT – LIFT LIQUID END BOWL HEAD
2	08	G0008717	EYE BOLT – REMOVE CONVEYOR FROM BOWL
2	07	G0008709	JACK BOLT – REMOVE CONV. BEARING FROM HUB – REMOVE HUB FROM THRUST RING ON L.E. MAIN BEARING
2	06	G0008708	JACK BOLT – REMOVE BOWL DRIVE SHEAVE/CONV. BEARING HUB
2	05	G0008707	JACK BOLT – REMOVE CONVEYOR GEAR BOX OUTPUT SHAFT HUB
1	04	16954–01	CONVEYOR SUPPORT – CONVEYOR HORIZONTAL REMOVAL
2	03	G0002559	M16 X 2.0 NUT – REMOVE GEAR BOX
2	02	G0008706	JACK BOLT – REMOVE LIQUID END BOWL HEAD
	01	TOOL KIT ASSEMBLY	ASSEMBLY COMPLETE

REF: 16590–00

REV	CHANGE	CKD	DATE

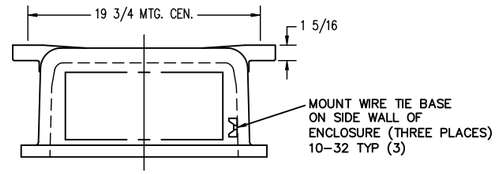
TITLE
TOOL KIT–REPAIR
DE–7200 CENTRIFUGE

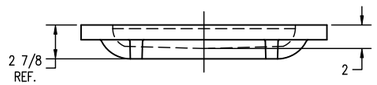
DWN	CKD	DATE	SCALE	REV
CCS		5/16/08	1:1	

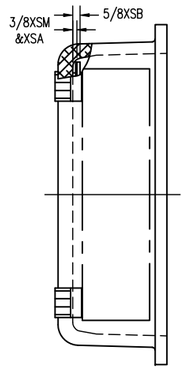
SHEET SIZE		DWN	DRAWING NO.
A	N	CKD	16798–00
	F C		

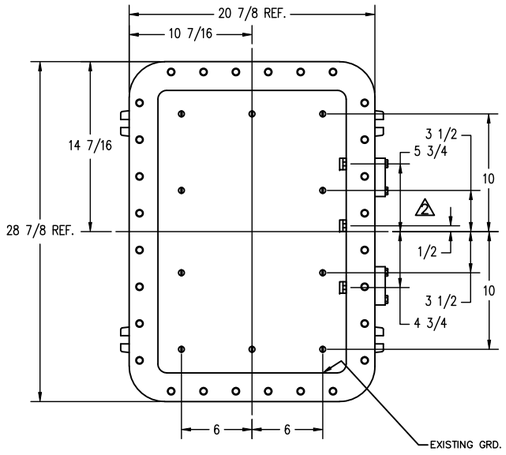
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

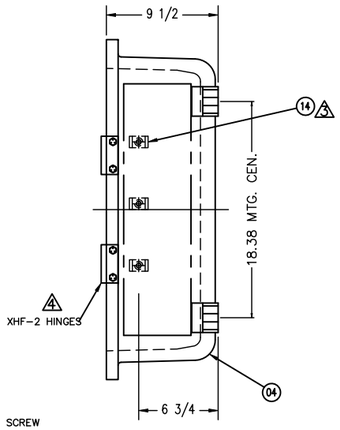
CENT

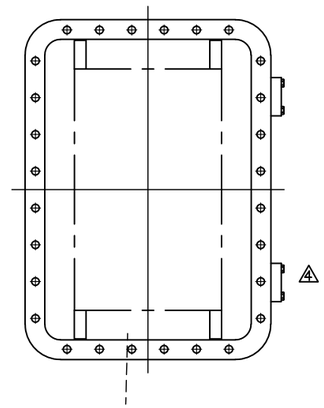




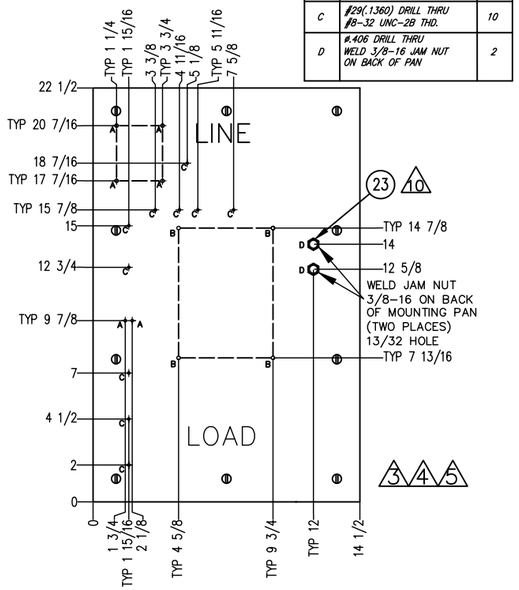




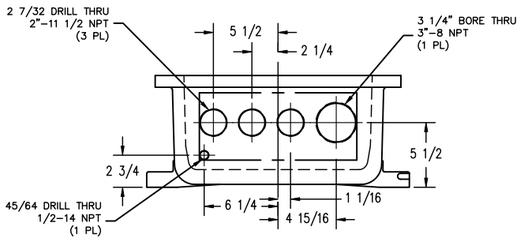


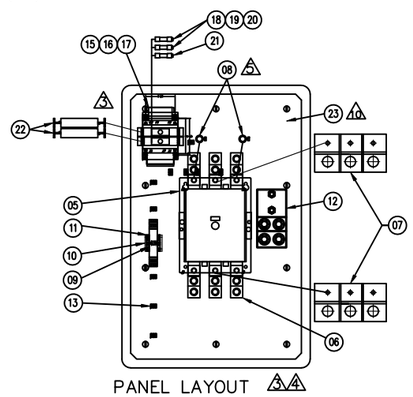


16X24X2 COVER



NOT TO SCALE





PANEL LAYOUT 3 4

REF. EL # 14394-00-009

4 NOTES
1) HINGE ON RIGHT SIDE
2) POWDER COAT PHENOLIC BEIGE

10	2	2	2	24	G0002619	WELD NUT 3/8-16 SST	
10	1	1	1	23	G0012659	MOUNTING PLATE 16 X 24	GALV STEEL
	1	1	1	22	G0002874	FUSE COVER/PULLER	FOR REPLACEMENT
	1	1	1	21	G0002926	SECONDARY FUSE 120 V	1.25A FUSE
	2			20	G0008999	PRIMARY FUSE 575/600 V	4/10 A FUSE TIME DELAY
		2		19	G0004195	PRIMARY FUSE 460/480 V	1/2 A FUSE TIME DELAY
			2	18	G0008998	PRIMARY FUSE 380/400 V	6/10 A FUSE TIME DELAY
	1			17	G0009000	CONTROL TRANSFORMER	100VA 600/120
		1		16	G0002481	CONTROL TRANSFORMER	100VA 480/120
			1	15	G0002482	CONTROL TRANSFORMER	100VA 380/115
6	3	3	3	14	G0003519	SCREW STYLE WIRE TIE DOWN LARGE	
	10	10	10	13	PAN-TM3S10-C	SCREW STYLE WIRE TIE DOWN SMALL	
	1	1	1	12	G0007945	GROUNDING LUG	
	2	2	2	11	G0007012	TERMINAL END BLOCK	6MM
	2	2	2	10	G0006292	DIN RAIL	35MM X 7.5MM X 1.5" ZPL STL
8 7	1	1	1	09	G0009286	INTRINSIC BARRIER	
	2	2	2	08	G0007694	CONTROL CIRCUIT TERMINAL	
	2	2	2	07	G0007693	TOUCH PROOF COVERS	
	6	6	6	06	G0007692	TERMINAL LUGS	(2) #4-350 MCM
	1	1	1	05	G0007691	CONTACTOR 350A	
	1	1	1	04	G0007835	ENCLOSURE 16 X 24 X 08	EXPLOSIONPROOF-S9060 PHENOLIC BEIGE
	X			03	16607-03	575/600V CONTROL PANEL	ASSEMBLY COMPLETE
		X		02	16607-02	460/480V CONTROL PANEL	ASSEMBLY COMPLETE
			X	01	16607-01	380/400V CONTROL PANEL	ASSEMBLY COMPLETE
4	QTY		ITEM	PART NUMBER	PART NAME	DESCRIPTION	

REV	CHANGE	CKD	DATE
10	SEE PAPER SPACE FOR REV 1-8, ADD ITEM 23 (WAS PREVIOUSLY INCLUDED WITH ITEM 04) ADD ITEM 24	JWC JFS	05/29/12
9	REVISE MOUNTING HOLE B (WAS 5/16-18)	JWC JFS	11/09/10

TITLE: EXPLOSION PROOF ENCLOSURE ASSEMBLY FOR POWER SUPPLY TO DE-7200 CENTRIFUGE

DWN JFS | CKD MC | DATE 1/25/07 | SCALE 1:10 | REV 10

SHEET SIZE C | N | F C

DWN KWJ 1/25/07

CKD JFS 1/25/07

DRAWING NO. 16607-00

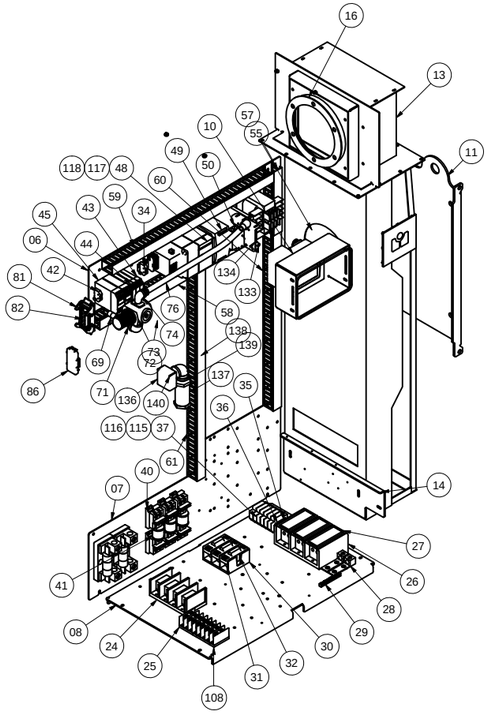
DERRICK® CORPORATION
590 DUKE ROAD BUFFALO, NY 14225 U.S.A.

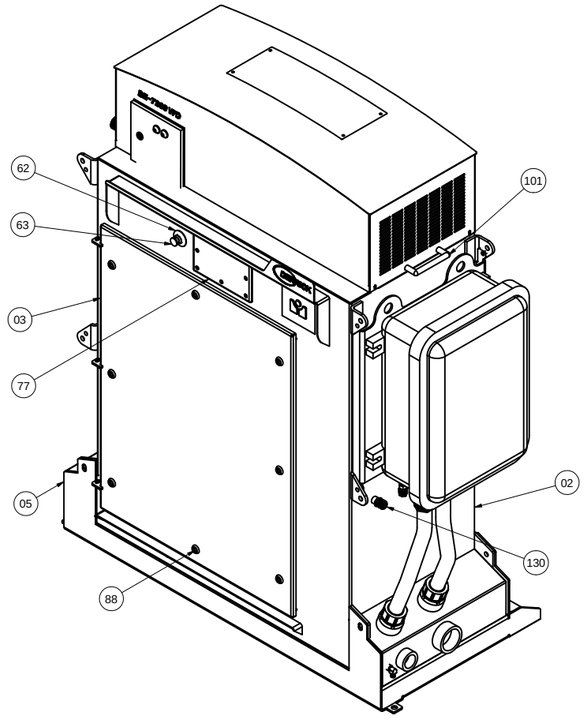
CENT, BOW

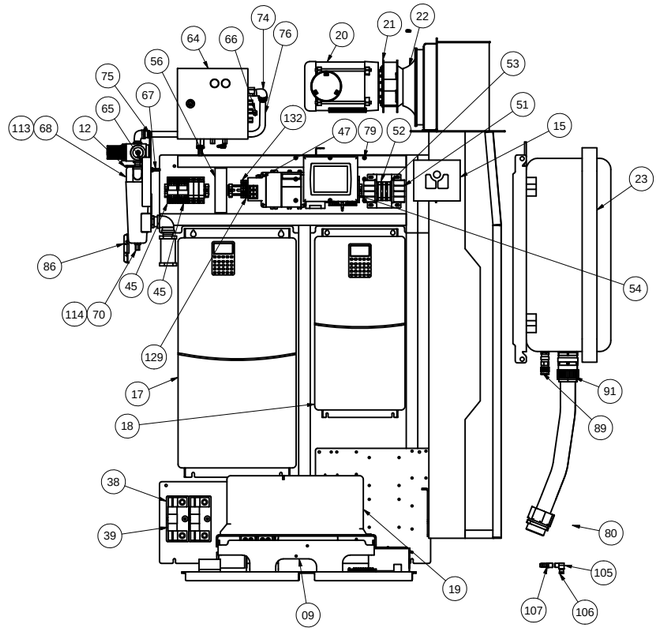
ITEM	QTY	PART NUMBER	DESCRIPTION
01	X	16472-01-002	ASSEMBLY COMPLETE
02	1	16396-01-008	ENCLOSURE ASSEMBLY
03	1	16400-01-003	DOOR ASSEMBLY
04	1	16401-01-002	COVER ASSEMBLY
05	1	16402-01-001	STAND ASSEMBLY
06	1	16404-01-004	COMPONENT PANEL (UPPER)
07	1	16404-02-004	COMPONENT PANEL (LOWER)
08	1	16404-03-004	COMPONENT PANEL (BOTTOM)
09	1	16404-01-003	COMPONENT MOUNT ASSY
10	1	16405-01	DISPLAY SCREEN MOUNT
11	1	16597-01	ENCLOSURE MOUNTING BRACKET
12	1	16598-01	AIR FILTER MOUNTING BRACKET
13	1	G0002881	AIR CONDITIONER, 12,000 BTU/HR 460/60/3
14	1	16403-01	A/C SUPPORT ANGLE
15	1	17006-01	INDUSTRIAL MOUSE W/CABLE
16	1	15197-01-003	INLET CONE EXTENSION
17	1	G0007573	DRIVE, 150 HP 460VAC 60 HZ
18	1	G0007690	DRIVE, 60 HP 460VAC 60 HZ
19	1	G0007689	DRIVE, 30 HP 460VAC 60 HZ
20	1	G0007588	AIR CONDITIONER COOLING MOTOR
21	1	G0002603	FAN WHEEL, 8" BACKWARD CURVED
22	1	G0002604	INLET CONE
23	1	16607-02	EX-PROOF ENCLOSURE
24	1	G0008966	BLOCK,PWR DISTR-4 POLE (1)#4-500MCM
25	2	G0008891	BLOCK,PWR DISTR-3 POLE 2/0-#14
26	1	G0008941	POWER DIST. BLOCK, INCOMING
27	3	G0008942	POWER DIST. BLOCK COVER
28	2	G0007213	GROUND LUG, INCOMING
29	1	G0005309	GROUND BUS BAR, INCOMING 7PT
30	1	G0007221	FUSE BLOCK, 60 AMP 3P CLASS J
31	3	G0007698	FUSE, 60 AMP CLASS J
32	3	G0007223	FUSE COVER, INDICATING
33	1	G0007998	DIN RAIL, 35MM X 5 1/2
34	6	G0008507	TERMINAL BLOCK END BARRIER - 6mm
35	8	G0008562	TERMINAL BLOCK GREY 4PT
36	1	G0009839	TERMINAL BLOCK JUMPER
37	2	G0007214	FUSE BLOCK, 30 AMP 3P CLASS CC
38	2	G0007224	FUSE BLOCK, 200 AMP 1P CLASS J
39	2	G0007225	FUSE, 150 AMP CLASS J TYPE HSJ
40	6	G0007631	FUSE HOLDER, 400 AMP 1P CLASS T
41	3	G0007632	FUSE, 225 AMP CLASS T
42	1	G0007645	DIN RAIL, 35MM X 5
43	1	G0009286	BARRIER, INTRINSIC SAFE-VIBR SWITCH+E-STOP
44	2	17325-01	BARRIER, INTRINSIC SAFE-RTD SENSOR-PROGRAMMED
45	2	17244-02	BARRIER, INTRINSIC SAFE-SPEED SENSOR-PROGRAMMED
46	1	G0007999	DIN RAIL, 35MM X 16
47	1	G0007231	ETHERNET SWITCH, 6 PORT
48	1	G0007228	PLC, COMPACTLOGIX PROCCESSOR
49	1	G0003552	POWER SUPPLY, 24VDC, 5 AMP
50	1	G0003504	SURGE SUPPRESSOR, 120V 60HZ
51	1	G0003494	TRANSFORMER, 500VA, 460V PRI/120V SEC
52	2	G0002910	FUSE, TIME DELAY 2.5A 600VAC
53	1	G0002911	FUSE, TIME DELAY 7.0A 250VAC
54	1	G0007976	OPERATOR INTERFACE - 120VAC PROGRAMMED
55	1	17006-02	USB CABLE ASSEMBLY
56	1	G0008000	WIRE DUCT, 1/2 X 2 X 6
57	1	G0008001	WIRE DUCT, 1/2 X 2 X 10 1/2
58	1	G0008002	WIRE DUCT, 1/2 X 2 X 33 1/8
59	1	G0007338	WIRE DUCT, 1/2 X 2 X 30 3/4
60	1	G0007650	WIRE DUCT, 1/2 X 2 X 28 7/8
61	1	G0008010	WIRE DUCT, 1/2 X 2 X 34 3/8
62	1	G0007244	NAMEPLATE, EMERGENCY STOP
63	1	G0005325	BUTTON, EMERGENCY STOP
64	1	G0007865	PURGE UNIT W/RELIEF VALVE
65	1	G0008006	RELIEF VALVE (SERIAL # OF PURGE REQUIRED)
66	2	IMP-116B-02X02	1/8 90 DEG STREET ELBOW, BRASS
67	2	G0004679	1/8 X 3/16 HOSE BARB
68	1	G0003565	AIR FILTER, DX
69	1	NPLE-50X200S-4	1/2 X 2 PIPE NIPPLE, SST
70	1	G0002300	AIR FILTER, BX
71	2	G0002716	1/2 X 1 1/2 PIPE NIPPLE, SST
72	1	G0002714	1/2 90 DEG ELBOW, SST
73	1	G0009927	AIR REGULATOR
74	2	G0008003	1/2 90 DEG STREET ELBOW, BRASS
75	3	G0008004	1/2 X 1/2 HOSE BARB
76	1	G0008009	AIR HOSE
77	1	15181-01-001	DISPLAY SCREEN PROTECTIVE COVER
78	1	G0004364	O-RING, PROTECTIVE COVER
79	8	G0008007	1/4-20 SEALING PAN HEAD SCREW
80	2	G0012883	2 1/2" CORD FITTING
81	1	G0007846	CONNECTOR HOUSING
82	1	G0007848	INSERT TERMINAL, FEMALE
83			
84			
85			
86	1	G0007851	CONNECTOR COVER, HOUSING
87			
88	8	G0008005	DOOR LATCH
89	1	11881-01-025	XP CABLE ASSEMBLY
90	1	17382-01-001	CORD ASSEMBLY, 20 AWG
91	2	16627-01-001	CABLE ASSEMBLY
92	35	G0007252	WIRE DUCT FASTENER MOUNT
93	28	PAN-TMS10-C	WIRE SADDLE, SMALL
94	13	G0003519	WIRE SADDLE, MEDIUM
95			
96	1	G0007951	ETHERNET CABLE X 8 1/2 (ETH SW-PLC)
97	1	G0007952	ETHERNET CABLE X 62 (ETH SW-PNL VIEW)
98	1	G0007953	ETHERNET CABLE X 84 (ETH SW-60HP)
99	1	G0007954	ETHERNET CABLE X 104 (ETH SW-150HP)
100	1	G0007955	ETHERNET CABLE X 178 (ETH SW-30HP)
101	2	G0004970	HANDLE,COVER
102	2	G0007701	LUG, CRIMP #6 AWG
103	6	G0007633	LUG, CRIMP #1 AWG
104	2	G0007256	LUG, CRIMP #2 AWG
105	1	IMP-116B-04X04	1/4 90 DEG STREET ELBOW, BRASS
106	1	CRH-ECD-284	1/4 DRAIN PLUG
107	1	G0008267	1/2 X 1/4 NPT HOSE BARB
108	2	G0008892	BLOCK,PWR DISTR-1 POLE 2/0-#14 W/ADDER
109	8	G0008893	COVER,DISTR BLOCK-FOR G0008891/8892
110	4	G0008890	COVER,DISTR BLOCK-FOR G0008966
111			
112	1	G0007995	COMPACT FLASH MEMORY CARD
113	1	G0002301	AIR ELEMENT, DX (REPLACEMENT ONLY)
114	1	G0002302	AIR ELEMENT, BX (REPLACEMENT ONLY)
115	3	G0008792	FUSE, TIME DELAY-3.0 AMP CLASS CC
116	3	G0003493	FUSE, TIME DELAY-15 AMP CLASS CC
117	1	G0007229	PLC POWER SUPPLY
118	1	G0007230	PLC END BARRIER
119	1	G0002873	COVER, CONTROL TRANSFORMER
120	1	G0002874	FUSE PULLER, CONTROL TRANFORMER
121	3	SHPP-100	1" NPT PLUG
122	1	SHPP-150	1 1/2" NPT PLUG
123	3	SHPP-200	2" NPT PLUG
124	1	SHPP-250	2 1/2" NPT PLUG
125	1	G0007258	REDUCER, 3" TO 2" NPT

ITEM	QTY	PART NUMBER	DESCRIPTION
126	1	TBS2535	CORD FITTING, 3/4"
127	1	CRH-EL296	CORD FITTING, 90 DEGREE
128	1	G0009972	SENSOR CABLE
129	2	G0008563	TERMINAL BLOCK-4 COND. ORANGE
130	2	G0002711	1/2" CORD FITTING
131	1	G0008349	PLC BATTERY
132	2	G0009324	TERMINAL BLOCK-4PT COND. YELLOW/GRN
133	1	G0009974	SENSOR, RTD
134	1	17420-01	A/C THERMOSTAT MOUNTING BRACKET
135	1	G0009291	A/C EVAPORATOR FAN (REPLACEMENT PART ONLY)
136	1	G0012168	COVER, WATER/DUST
137	1	G0012122	VALVE,CHECK 1" NPT FEMXFEM BRASS
138	1	S4PE-EL-100	ELBOW,PIPE-1" FPT 90DEG 150# 304 SS
139	1	G0012167	NIPPLE, PIPE-1"XCLOSE SCHED40 304SS
140	1	G0012166	ARRESTOR, SPARK UNIV SST
141	1	G0009864	TUBE 6MM X 12" LONG
142	1	G0009863	ELBOW, 1/8" QUICK CONNECT
143	1	G0008571	TERMINAL BLOCK GROUND-GREEN 2 PT
144	1	G0008544	TERMINAL BLOCK BARRIER-ORANGE 2 PT
145	1	G0013391	1/2" LOCKNUT
146	1	G0009340	1/2" SEALING GASKET
147	1	PP1290	1/2" INSUL. BUSHING

SPECIAL TOOL: PURGE PRESSURE MEASURING KIT-G0008378







13 REF WS 14394-00-009

REV	DESCRIPTION	BY	CK'D	DATE
13	UPDATED DESCRIPTION OF ITEM 45, OMITTED ITEM 95, WAS G0009727, CHANGES PER ELECT. ENG. DEPT.	WS	JWC	9/16/13
12	ITEM 35 QTY WAS 7, ITEM 44 WAS G0007918, ITEM 80 WAS G0012883, ITEM 89 WAS G0004444, ITEM 90 WAS G0004418, ITEM 121 WAS QTY 2, ITEM 128 WAS G0009272, ITEM 129 QTY WAS 8, ITEM 130 QTY WAS 1, ITEM 132 QTY WAS 3, ADDED ITEMS 141-147, REMOVE ITEMS 83,84,85,87	BJR		10/23/13
11	ITEM 02: 16396-01-008 WAS 16396-01-003	EJR		10/8/12
10	ITEM 95 WAS G0002967; 111 WAS G0002966; QTY ITEM 129 WAS 3; UPDATED DESCRIPTION OF 89,90;108	DMM		7/10/12
9	MODIFIED ITEMS 29 (WAS G0007610), 34 (WAS G0007012), 35 (WAS G0007216), 36 (WAS G0007237), 54 (WAS G0008825), 128 (WAS G0007868), 130 (WAS G0008572), 131 (WAS G0008544), 132 (WAS G0008571) AND 133 (WAS G0009973). CHANGED QTY ON ITEMS 90 (WAS 2), 129 (WAS 3) AND 132 (WAS 1).	JMB		4/11/12
8	ADDED ITEMS 136-140	BKS		8/5/11
7	ITEM 16 WAS 15197-01-001 PER DRR#2563; ADDED ITEMS 133, 134, & 135; ITEM 73 WAS G0009927; ITEM 71 & 71 QTY WAS 1; ITEM 74 QTY WAS 2	DJK		5/5/2011
6	ADDED ITEMS 117-132; ITEM 43 WAS G0007232; ITEM 44 WAS G0007233; ITEM 45 WAS G0007234.	CCS		2/4/2010
5	ITEM 54 WAS G0007245; ITEM 24 WAS G0008261; ITEM 25 WAS G0008262; ITEM 26 WAS G0007210; ITEM 27 WAS G0007211; ITEM 109 WAS G0008264; ITEM 110 WAS G0008265; ITEM 111 WAS G0008266; ITEM 91 WAS 16627-01; ITEM 80 WAS G0003529.	CCS		12/18/2008
4	ITEM 15 WAS 16609-01; ITEM 55 WAS G0007863; ITEM 22 WAS 16622-01.	CCS		11/3/2008
3	ADDED ITEMS 112 THRU 116.ADDED NOTE	CCS		5/12/2008
2	ITEM 03 WAS 16400-01-001; QUANTITY WAS 5 ON ITEM 88.	CCS		8/23/2007
1	ITEM 30 WAS G0007217; ITEM 31 WAS G0007218; ADDED ITEMS.	CCS		8/13/2007

REVISION HISTORY

GEOMETRIC CHARACTERISTIC SYMBOLS	
FLATNESS	▱
STRAIGHTNESS	—
ROUNDNESS	○
CYLINDRICITY	⌭
PARALLELISM	//
PERPENDICULARITY	⊥
ANGULARITY	∠
RUNOUT	↗
POSITION	⌖
CONCENTRICITY	◎
SYMMETRY	⌯

TOLERANCES UNLESS SPECIFIED

DEC	MM
(2) PLACE DEC. +/- .0100	+/- .254
(3) PLACE DEC. +/- .0050	+/- .127
(4) PLACE DEC. +/- .0002	+/- .005
ANGLES +/- .1°	+/- .1°

DO NOT SCALE DRAWING

DRAWN	fjmonroe	4/11/2007
CHECKED	CCSMITH	5/9/2007
QA		
MFG		
APPROVED		

DERRICK® CORPORATION

TITLE

CONTROL ENCLOSURE ASSEMBLY
DE-7200 EX-PROOF 460/480/60/3

SIZE	FC	DWG NO	REV
D	Y	16472-00-002	13

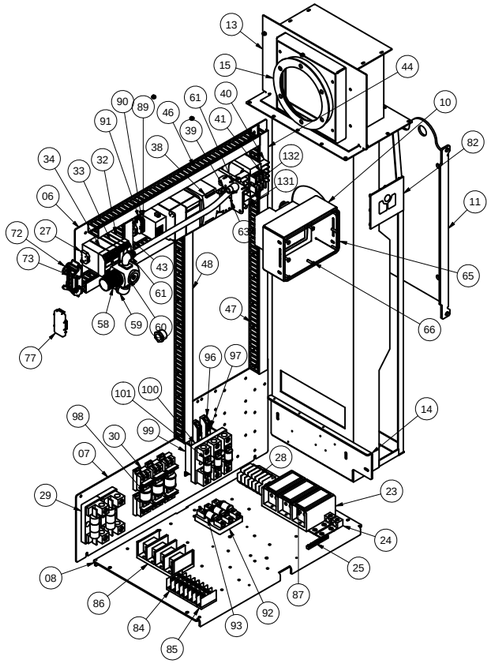
SCALE 1:10 SHEET 1 OF 1

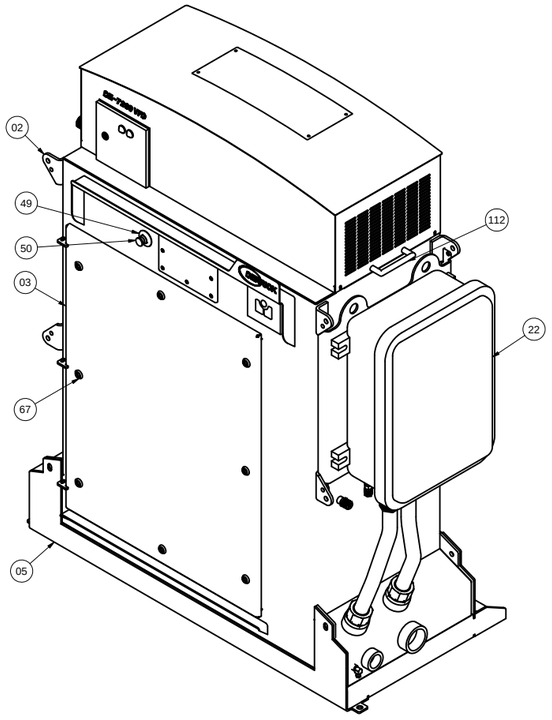
CENT,MAN,C-RM

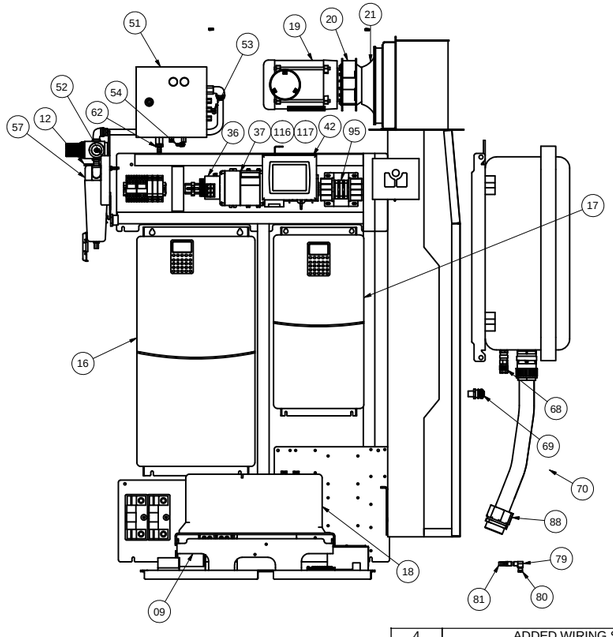
ITEM	QTY	DRAWING NUMBER	DESCRIPTION
01	X	16472-01-003	ASSEMBLY COMPLETE
02	1	16396-01-003	ENCLOSURE ASSEMBLY
03	1	16400-01-003	DOOR ASSEMBLY
04	1	16401-01-002	COVER ASSEMBLY
05	1	16402-01-001	STAND ASSEMBLY
06	1	16404-01-004	COMPONENT PANEL (UPPER)
07	1	16404-02-004	COMPONENT PANEL (LOWER)
08	1	16404-03-004	COMPONENT PANEL (BOTTOM)
09	1	16404-01-003	COMPONENT MOUNT ASSEMBLY
10	1	16405-01	DISPLAY SCREEN MOUNT
11	1	16597-01	ENCLOSURE MOUNTING BRACKET
12	1	16598-01	AIR FILTER MOUNTING BRACKET
13	1	G0002881	AIR CONDITIONER, 12,000 BTU/HR 460/60/3
14	1	16403-01	A/C SUPPORT ANGLE
15	1	15197-01-003	INLET CONE EXTENSION
16	1	G0009358	DRIVE, 150 HP 380VAC 50HZ
17	1	G0009359	DRIVE, 60 HP 380VAC 50HZ
18	1	G0009360	DRIVE, 30 HP 380VAC 50HZ
19	1	G0007588	AIR CONDITIONER COOLING MOTOR
20	1	G0002603	FANWHEEL, 8" BACKWARD CURVED
21	1	G0002604	INLET CONE
22	1	16607-01	EX-PROOF ENCLOSURE
23	1	G0008941	POWER DIST. BLOCK, INCOMING
24	2	G0007213	GROUND LUG, INCOMING
25	1	G0005309	GROUND BUS BAR, INCOMING
26	1	G0007998	DIN RAIL, 35MM X 5 1/2
27	6	G0008507	TERMINAL BLOCK END BARRIER
28	2	G0007214	FUSE BLOCK, 30 AMP 3P CLASS CC
29	2	G0007224	FUSE BLOCK , 200 AMP 1P CLASS J
30	6	G0007631	FUSE HOLDER, 400 AMP 1P CLASS T
31	1	G0007645	DIN RAIL, 35MM X 5
32	1	G0009286	BARRIER, INTRINSIC SAFE-VIBR SWITH + E-STOP
33	2	17325-01	BARRIER, INTRINSIC SAFE-RTD SENSOR-PROGRAMMED
34	2	17244-02	BARRIER, INTRINSIC SAFE-SPEED SENSOR
35	1	G0007999	DIN RAIL, 35MM X 16
36	1	G0007231	ETHERNET SWITCH, 6 PORT
37	1	G0007228	PLC, COMPACTLOGIX PROCESSOR
38	1	G0003552	POWER SUPPLY, 24VDC 5 AMP
39	1	G0003504	SURGE SUPPRESSOR, 120V 60HZ
40	1	G0008800	TRANSFORMER, 500VA, 400V PRI/115V SEC
41	1	G0002911	FUSE, TIME DELAY-7.0A 250VAC
42	1	G0007976	OPERATOR INTERFACE-120VAC - PRPOGRAMMED
43	1	G0008000	WIRE DUCT, 1 1/2 X 2 X 6
44	1	G0008001	WIRE DUCT, 1 1/2 X 2 X 10 1/2
45	1	G0008002	WIRE DUCT, 1 1/2 X 2 X 33 1/8
46	1	G0007338	WIRE DUCT, 1 1/2 X 2 X 30 3/4
47	1	G0007650	WIRE DUCT, 1 1/2 X 2 X 28 7/8
48	1	G0008010	WIRE DUCT, 1 1/2 X 2 X 34 3/8
49	1	G0007244	NAMEPLATE, EMERGENCY STOP
50	1	G0005325	BUTTON, EMERGENCY STOP
51	1	G0007865	PURGE UNIT W/RELIEF VALVE
52	1	G0008006	RELIEF VALVE (SERIAL # OF PURGE REQUIRED)
53	2	IMP-116B-02X02	1/8 90 DEG STREET ELBOW, BRASS
54	2	G0004679	1/8 X 3/16 HOSE BARB
55	1	G0003565	AIR FILTER, DX
56	1	NPLE-50X200S-4	1/2 X 2 PIPE NIPPLE, SST
57	1	G0002300	AIR FILTER, BX
58	2	G0002716	1/2 X 1 1/2 PIPE NIPPLE, SST
59	1	G0002714	1/2 90 DEG ELBOW, SST
60	1	G0009927	AIR REGULATOR
61	2	G0008003	1/2 90 DEG STREET ELBOW, BRASS
62	3	G0008004	1/2 X 1/2 HOSE BARB
63	1	G0008009	AIR HOSE
64	1	15181-01-001	DISPLAY SCREEN PROTECTIVE COVER
65	1	G0004364	O-RING, PROTECTIVE COVER
66	8	G0008007	1/4-20 SEALING PAN HEAD SCREW
67	8	G0008005	DOOR LATCH
68	1	G0009753	PLUG, M63
69	2	G0002711	1/2" CABLE FITTING
70	2	16627-01-001	CABLE ASSEMBLY 2/O-4C GEXOL
71	1	G009767	CABLE, GEXOL 16 AWG-6C (6FT) ASSY W/ XP GLAND
72	1	G0007846	CONNECTOR HOUSING
73	1	G0007848	INSERT TERMINAL, FEMALE
74	1	G0008571	TERMINAL BLOCK GOUND-GREEN 2 PT
75	1	G0008544	TERMINAL BLOCK BARRIER-ORANGE 2 PT
76	1	17382-01-001	CORD ASSY, 20 AWG
77	1	G0007851	CONNECTOR COVER, HOUSING
78			
79	1	IMP-116B-04X04	1/4 90 DEG STREET ELBOW, BRASS
80	1	CRH-ECD-284	1/4 DRAIN PLUG
81	1	G0008267	1/2 X 1/4 NPT HOSE BARB
82	1	17006-01	INDUSTRIAL MOUSE W/CABLE
83	1	17006-02	CABLE ASSEMBLY
84	2	G0008891	BLOCK, POWER DISTR-3 POLE 2/0/#14
85	2	G0008892	BLOCK, POWER DISTR-3 POLE 2/0 #14 W/ADDER
86	1	G0008966	BLOCK, POWER DISTR-4 POLE (1)#4-500MCM
87	3	G0008942	POWER DIST. BLOCK COVER
88	2	G0012883	2 1/2" CORD FITTING
89	2	G0008563	TERMINAL BLOCK-4 COND ORANGE
90	7	G0008562	TERMINAL BLOCK-4 COND GREY
91	2	G0009324	TERMINAL BLOCK-4 COND YELLOW/GREEN
92	1	G0009477	FUSE BLOCK, 100A 600V 3P CLASS T
93	3	G0009476	FUSE, 90 AMP 600V CLASS T
94	2	G0009357	FUSE, 200 AMP 600V CLASS J
95	2	G0001651	FUSE, TIME DELAY-3-2/10 AMP CLASS CC
96	2	G0007227	MODULE, DIODE-DOUBLE-100 AMP
97	2	16894-01-002	JUMPER, BUS
98	3	G0009356	FUSE, 250 AMP 600V CLASS T
99	1	17306-01	STAND OFF, FUSE HOLDER
100	1	G0009354	FUSE BLOCK, 200 AMP 600V 3P CLASS T
101	3	G0009530	FUSE, 125 AMP 600V CLASS T
102	3	G0008792	FUSE, TIME DELAY-3.0 AMP CLASS CC
103	3	G0003493	FUSE, TIME DELAY-15 AMP CLASS CC
104	1	G0007951	ETHERNET CABLE X 8 1/2 (ETH SW-PLC)
105	1	G0007952	ETHERNET CABLE X 62 (ETH SW-PNL VIEW)
106	1	G0007953	ETHERNET CABLE X 84 (ETH SW-60HP)
107	1	G0007954	ETHERNET CABLE X 104 (ETH SW-150HP)
108	1	G0007955	ETHERNET CABLE X 178 (ETH SW-30HP)
109	35	G0007252	WIRE DUCT FASTENER MOUNT
110	28	PAN-TM3S10-C	WIRE SADDLE, SMALL
111	13	G0003519	WIRE SADDLE, MEDIUM
112	2	G0004970	HANDLE, COVER
113	8	G0008893	COVER, DISTR BLOCK-FOR G0008891/8892
114	4	G0008890	COVER, DISTR BLOCK FOR G0008966
115	1	G0009753	STOPPING PLUG M 63
116	1	G0007229	PLC POWER SUPPLY
117	1	G0007230	PLC END BARRIER
118	1	G0007995	COMPACT FLASH MEMORY CARD
119	4	G0009563	LUG, CRIMP-1 AWG #10 STUD
120	1	G0002301	AIR ELEMENT, DX (REPLACEMENT ONLY)
121	1	G0002302	AIR ELEMENT, BX (REPLACEMENT ONLY)
122	1	G0002873	COVER, CONTROL TRANSFORMER
123	1	G0002874	FUSE PULLER, CONTROL TRANSFORMER
124	1	NPLE-75 COND	COND NIPPLE
125	1	G0009972	SENSOR CABLE

ITEM	QTY	DRAWING NUMBER	DESCRIPTION
126	1	G0008349	PLC BATTERY (REPLACEMENT ONLY)
127	3	G0008449	ADAPTER/REDUCER 1"- M25
128	1	G0007258	REDUCER, 3" TO 2" NPT
129	1	TBS2535	3/4" CORD FITTING
130	1	CRH-EL 296	CORD FITTING, 90 DEG
131	1	G0009974	SENSOR, RTD
132	1	17420-01	A/C THERMOSTAT MOUNTING BRACKET
133	1	G0009291	A/C EVAPORATOR FAN
134	3	G0008813	STOPPING PLUG M25
135	1	G0009197	ADAPTER/REDUCER 1.5"- M40
136	1	G0008807	STOPPING PLUG M40
137	3	G0008451	ADAPTER/REDUCER 2"-M50
138	3	G0008455	STOPPING PLUG M50
139	1	G0009467	ADAPTER/REDUCER 2.5" - M63
140	1	G0009466	STOPPI NG PLUG M63
141	1	G0009751	ADAPTER/REDUCER 3" -M50
142	1	G0009752	STOPPING PLUG M50
143	1	G0009568	ADAPTER/REDUCER 3"-M63
144	1	G0009864	TUBE 6MM X 12" LONG
145	1	G0009863	ELBOW, 1/8" QUICK CONNECT
146	1	G0013390	1/2" LOCKNUT
147	1	G0009340	1/2" SEALING GASKET
148	1	PP1290	1/2" INSUL. BUSHING

SPECIAL TOOL-PURGE PRESSURE MEASURING KIT-G0008378







4
REF WS 14394-00-011

REV	DESCRIPTION	BY	CK'D	DATE
4	ADDED WIRING SCHEMATIC NUMBER PER ELECTRICAL ENGINEERING DEPT.	WS	JWC	9/16/2013
3	ITEM 33 WAS G0007918, ITEM 68 WAS G0004444, ITEM 74 WAS G0007852, ITEM 75 WAS G0007850, ITEM 76 WAS G000 9238, ITEM 78 WAS G0007849, ITEM 88 WAS G0008964, ITEM 89 WAS QTY 3, ITEM 127 WAS QTY 2, ITEM 134 WAS QTY 2, ADD ITEMS 144-148.	BJR		7/23/2013
2	ITEM 25 WAS G0007610;42 WAS G0008825;69 WAS G0004418 QTY 1; 71 WAS G0002967;QTY 90 WAS 1;101 WAS G0009353;115 WAS G0002966;124 WAS SHPP-100;125 WAS SHPP-150; 126 WAS SHPP-200; 127 WAS SHPP-250; 131 WAS G0009973; ADDED ITEMS 134-143	DMM		7/2/2012
1	ITEM 15 WAS 15197-01-001 PER DRR# 2563; ADDED ITEMS 131, 132 & 133; ITEM 60 WAS G0008008; ITEM 58 & 61 QTY WAS 1; ITEM 59 QTY WAS 2	DJK		5/5/2011

DRAWN	CCS	6/28/2010
CHECKED		
QA		
MFG		
APPROVED		

DERRICK® CORPORATION

TITLE

CONTROL ENCLOSURE ASSEMBLY
DE-7200 EX-PROOF 380/400/3

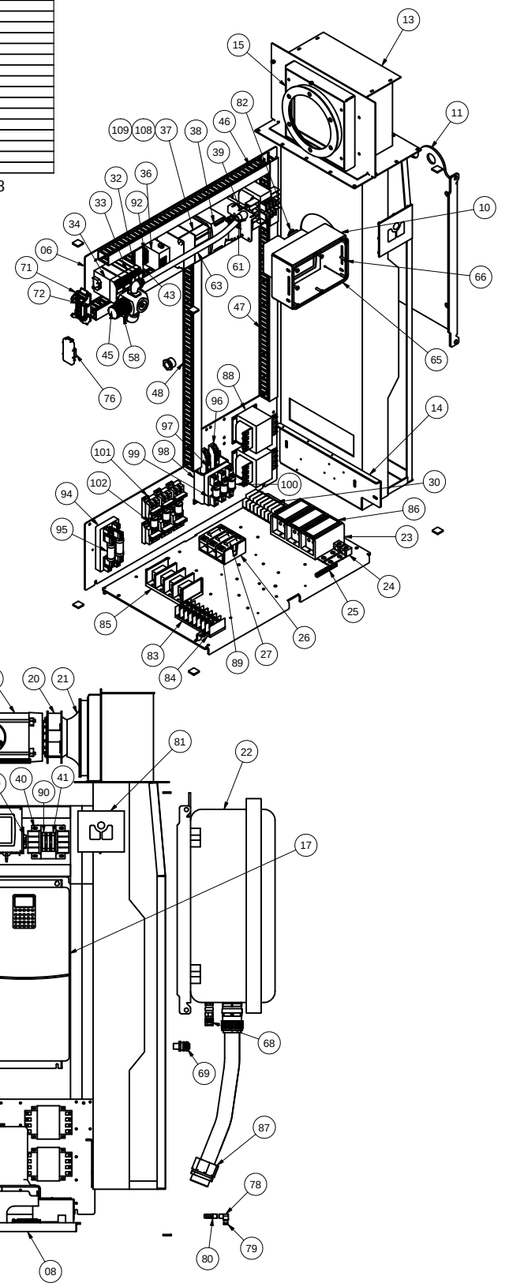
SIZE	FC	DWG NO	REV
D	Y	16472-00-003	4

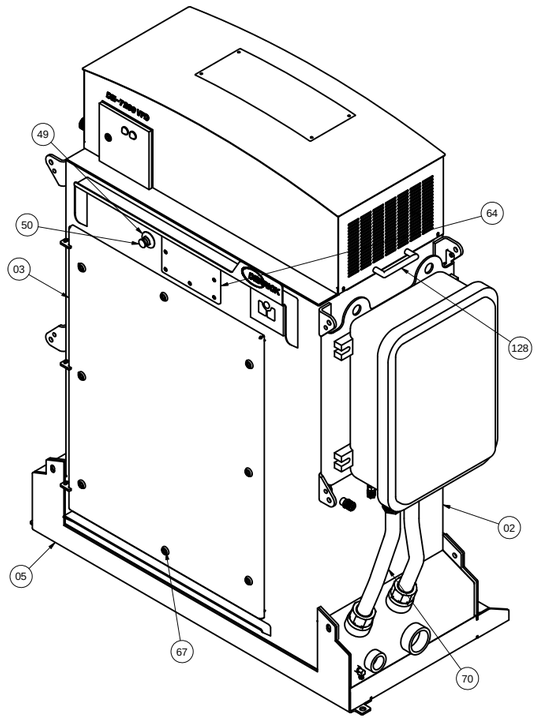
SCALE 1:10 SHEET 1 OF 1

CENT, MAN, C-RM

ITEM	QTY	PART NUMBER	DESCRIPTION
01	X	16472-01-004	ASSEMBLY COMPLETE
02	1	16396-01-003	ENCLOSURE ASSEMBLY
03	1	16400-01-003	DOOR ASSEMBLY
04	1	16401-01-002	COVER ASSEMBLY
05	1	16402-01-001	STAND ASSEMBLY
06	1	16404-01-004	COMPONENT PANEL (UPPER)
07	1	16404-02-004	COMPONENT PANEL (LOWER)
08	1	16404-03-004	COMPONENT PANEL (BOTTOM)
09	1	16404-01-003	COMPONENT MOUNT ASSEMBLY
10	1	16405-01	DISPLAY SCREEN MOUNT
11	1	16597-01	ENCLOSURE MOUNTING BRACKET
12	1	16598-01	AIR FILTER MOUNTING BRACKET
13	1	G0002891	AIR CONDITIONER, 12,000 BTU/HR 460/60/3
14	1	16403-01	A/C SUPPORT ANGLE
15	1	15197-01-003	INLET CONE EXTENSION
16	1	G0009350	DRIVE, 150 HP 600VAC 60 HZ
17	1	G0009351	DRIVE, 60 HP 600VAC 60 HZ
18	1	G0009352	DRIVE, 30 HP 600VAC 60 HZ
19	1	G0007588	AIR CONDITIONER COOLING MOTOR
20	1	G0002603	FANWHEEL, 8" BACKWARD CURVED
21	1	G0002604	INLET CONE
22	1	16607-03	EX-PROOF ENCLOSURE
23	1	G0008941	POWER DIST. BLOCK, INCOMING
24	2	G0007213	GROUND LUG, INCOMING
25	1	G0005309	GROUND BUS BAR, INCOMING
26	1	G0007221	FUSE BLOCK, 60 AMP CLASS J
27	3	G0007223	FUSE COVER, INDICATOR
28	1	G0007998	DIN RAIL, 35MM X 5 1/2
29	4	G0008507	TERMINAL BLOCK END BARRIER
30	3	G0007214	FUSE BLOCK, 30 AMP 3P CLASS CC
31	1	G0007645	DIN RAIL, 35MM X 5
32	1	G0009286	BARRIER, INTRINSIC SAFE-VIBR SWITCH+E-STOP
33	2	17325-01	BARRIER, INTRINSIC SAFE-RTD SENSOR-PROGRAMMED
34	2	17244-02	BARRIER, INTRINSIC SAFE-SPEED SENSOR
35	1	G0007999	DIN RAIL, 35MM X 16
36	1	G0007231	ETHERNET SWITCH, 6 PORT
37	1	G0007228	PLC, COMPACTLOGIX PROCESSOR
38	1	G0003552	POWER SUPPLY, 24VDC, 5 AMP
39	1	G0003504	SURGE SUPPRESSOR, 120V 60HZ
40	1	G0004986	TRANSFORMER, 500VA, 600PRI/120V SEC
41	1	G0002911	FUSE, TIME DELAY 7.0A 250 VAC
42	1	G0007976	OPERATOR INTERFACE - 120 VAC
43	1	G0008000	WIRE DUCT, 1 1/2 X 2 X 6
44	1	G0008001	WIRE DUCT, 1 1/2 X 2 X 10 1/2
45	1	G0008002	WIRE DUCT, 1 1/2 X 2 X 33 1/8
46	1	G0007338	WIRE DUCT, 1 1/2 X 2 X 30 3/4
47	1	G0007650	WIRE DUCT, 1 1/2 X 2 X 28 7/8
48	1	G0008010	WIRE DUCT, 1 1/2 X 2 X 34 3/8
49	1	G0007244	NAMEPLATE, EMERGENCY STOP
50	1	G0005325	BUTTON, EMERGENCY STOP
51	1	G0007865	PURGE UNIT W/RELIEF VALVE
52	1	G0008006	RELIEF VALVE (SERIAL # OF PURGE UNIT REQUIRED)
53	2	MP-116B-02X02	1/8 90 DEG STREET ELBOW, BRASS
54	2	G0004679	1/8 X 3/16 HOSE BARB
55	1	G0003565	AIR FILTER, DX
56	1	NPLE-50X200S-4	1/2 X 2 PIPE NIPPLE, SST
57	1	G0002300	AIR FILTER, BX
58	2	G0002716	1/2 X 1 1/2 PIPE NIPPLE, SST
59	1	G0002714	1/2 90 DEG ELBOW, SST
60	1	G0009927	AIR REGULATOR
61	2	G0008003	1/2 90 DEG STREET ELBOW, BRASS
62	3	G0008004	1/2 X 1/2 HOSE BARB
63	1	G0008009	AIR HOSE
64	1	15181-01-001	DISPLAY SCREEN PROTECTIVE COVER
65	1	G0004364	O-RING, PROTECTIVE COVER
66	8	G0008007	1/4-20 SEALING PAN HEAD SCREW
67	8	G0008005	DOOR LATCH
68	7	G0008562	TERMINAL BLOCK-GREY
69	2	G0002711	1/2" CABLE FITTING
70	2	16527-01-001	CABLE ASSEMBLY
71	1	G0007846	CONNECTOR HOUSING
72	1	G0007848	INSERT TERMINAL, FEMALE
73	1	G0009864	TUBE 6MM X 12" LONG
74	1	G0009863	ELBOW, 1/8" QUICK CONNECT
75	1	G0008571	TERMINAL BLOCK 2PT GROUND GREEN/YEL
76	1	G0007851	CONNECTOR COVER, HOUSING
77	1	17382-01-001	CORD ASSY, 20 AWG
78	1	IMP-116B-04X04	1/4 X 90 DEG STREET ELBOW, BRASS
79	1	CRH-ECD-284	1/4 DRAIN PLUG
80	1	G0008267	1/2 X 1/4 NPT HOSE BARB
81	1	17006-01	INDUSTRIAL MOUSE W/CABLE
82	1	17006-02	CABLE ASSEMBLY
83	2	G0008891	BLOCK, PWR DISTR-3 POLE 2/0 #14
84	2	G0008892	BLOCK, PWR DISTR-1 POLE 2/0 #14 W/ADDER
85	1	G0008966	BLOCK, PWR DISTR-4 POLE (1)#4-500MCM
86	3	G0008942	POWER DIST. BLOCK COVER
87	2	G0012883	2 1/2" CORD FITTING
88	2	G0008057	TRANSFORMER, 350VA 480V PRI/120 SEC
89	3	G0007222	FUSE, 50 AMP CLASS J
90	2	G0009183	FUSE, TIME DELAY2.0A 600 VAC
91	2	G0008563	TERMINAL BLOCK-4 COND, ORANGE
92	1	G0008544	TERMINAL BLOCK END PLATE 2PT ORANGE
93	2	G0009324	TERMINAL BLOCK GROUND-YELLOW/GREEN 4PT
94	1	G0009481	FUSE HOLDER, 100A 600V 2P CLASS J
95	2	G0009480	FUSE, 100A/600V CLASS J
96	2	G0007227	MODULE, DIODE-DOUBLE 100 AMP
97	2	16894-01-002	JUMPER, BUS
98	1	17306-01	STAND OFF, FUSE HOLDER
99	1	G0009477	FUSE HOLDER, 100A 600V 3P CLASS T
100	3	G0009476	FUSE, 90 AMP 600V CLASS T
101	6	G0007631	FUSE HOLDER 400 AMP 1P CLASS T
102	3	G0009353	FUSE, 175 AMP CLASS T
103			
104	8	G0008893	COVER, DIST. BLOCK-FOR G0008891/8892
105	4	G0008890	COVER DIST. BLOCK-FOR G0008966
106	3	G0008792	FUSE, TIME DELAY 3.0 AMP CLASS CC
107	6	G0009451	FUSE, TIME DELAY 5.0 AMP CLASS CC
108	1	G0007229	PLC POWER SUPPLY
109	1	G0007230	PLC END BARRIER
110	1	G0008349	PLC BATTERY REPLACEMENT
111	1	G0007995	COMPACT FLASH MEMORY CARD
112	1	G0002873	COVER, CONTROL TRANSFORMER
113	1	G0002874	FUSE PULLER, CONTROL TRANSFORMER
114	1	G0007951	ETHERNET CABLE X 8 1/2 (ETH SW-PLC)
115	1	G0007952	ETHERNET CABLE X 62 (ETH SW-PNL VIEW)
116	1	G0007953	ETHERNET CABLE X 84 (ETH SW-60 HP)
117	1	G0007954	ETHERNET CABLE X 104 (ETH SW-150 HP)
118	1	G0007955	ETHERNET CABLE X 178 (ETH SW-30 HP)
119	1	G0002301	AIR ELEMENT, DX (REPLACEMENT ONLY)
120	1	G0002302	AIR ELEMENT, BX (REPLACEMENT ONLY)
121	2	G0007701	LUG, CRIMP #6 AWG
122	6	G0007633	LUG, CRIMP #1 AWG
123	2	G0007256	LUG, CRIMP #2 AWG
124	1	G0002966	CABLE GLAND
125	1	TBS2535	3/4" CORD FITTING

SPECIAL TOOL-PURGE PRESSURE MEASURING KIT-G0008378





REF WS 14394-00-012

REV	DESCRIPTION	BY	CK'D	DATE
3	ADDED WIRING SCHEMATIC NUMBER PER ELECTRICAL ENGINEERING DEPT.	WS	JWC	9/17/2013
2	REVISED FOLLOWING ITEMS: 25 (WAS G0007610), 29 (WAS G0007012), 33 (WAS G0007918), 42 (WAS G0008825), 68 (WAS G0004444), 69 (WAS G0004418), 73 (WAS G0007852), 74 (WAS G0007850), 75 (WAS G0009238), 77 (WAS G0007849), 87 (WAS G0008964), 91 (WAS QTY 6), 92 (WAS G0008572), 103 (WAS G0007589), 107 (WAS QTY 3), 115 (WAS G0008122), 116 (WAS G0007952), 117 (WAS G0008123), 118 (WAS G0008121), 132 (WAS QTY 2), 138 (WAS G0009973). ADDED ITEMS 140-143	BJR		7/23/2013
1	ITEM 15 WAS 15197-01-001 PER DRR# 2563; ADDED ITEMS 137, 138 AND 139; ITEM 60 WAS G0008008; ITEM 58 & 61, QTY WAS 1; ITEM 59 QTY WAS 2	DJK		5/5/2011

DRAWN CCS 4/7/2010
CHECKED
QA
MFG
APPROVED

DERRICK® CORPORATION

TITLE
CONTROL ENCLOSURE ASSEMBLY
DE-7200 EX-PROOF 575/600/60/3

SIZE D | FC Y | DWG NO 16472-00-004 | REV 3
SCALE 1:10 | SHEET 1 OF 1

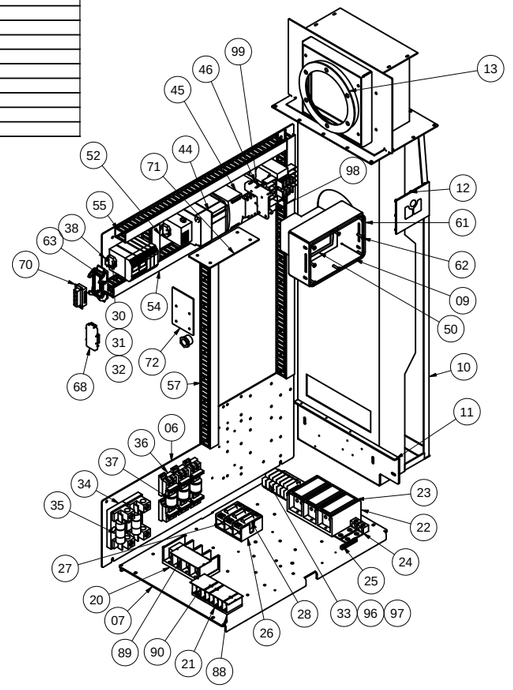
CENT, MAN, C-RM

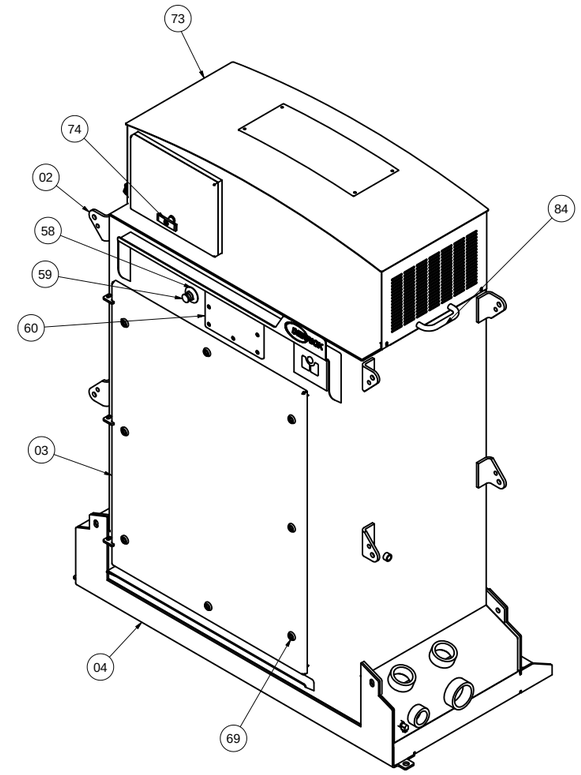
Parts List

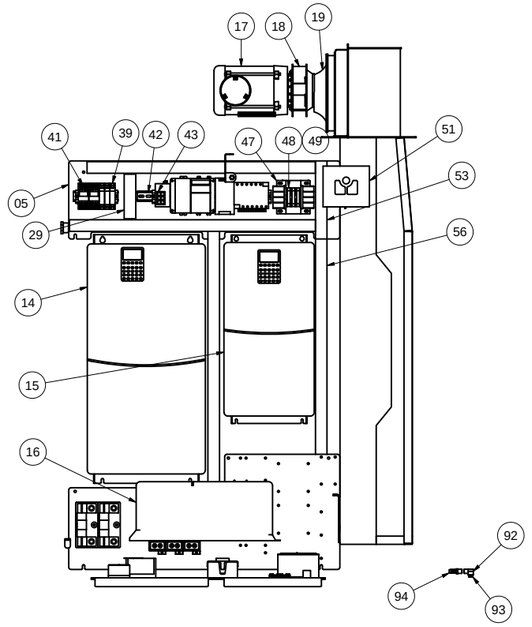
ITEM	QTY	DRAWING NUMBER	DESCRIPTION
01	X	16472-01-005	ASSEMBLY COMPLETE
02	1	16396-01-003	ENCLOSURE ASSEMBLY
03	1	16400-01-003	DOOR ASSEMBLY
04	1	16402-01-001	STAND ASSEMBLY
05	1	16404-01-004	COMPONENT PANEL (UPPER)
06	1	16404-02-004	COMPONENT PANEL (LOWER)
07	1	16404-03-004	COMPONENT PANEL (BOTTOM)
08	1	16404-01-003	COMPONENT MOUNT ASSEMBLY
09	1	16405-01	DISPLAY SCREEN MOUNT
10	1	G0002881	AIR CONDITIONER, 12,000 BTU/HR 460/60/3
11	1	16403-01	A/C SUPPORT ANGLE
12	1	16609-01	CONTROL MOUSE COVER
13	1	15197-01-003	INLET CONE EXTENSION
14	1	G0007573	DRIVE, 150 HP 460VAC 60 HZ
15	1	G0007690	DRIVE, 60 HP 460VAC 60 HZ
16	1	G0007689	DRIVE, 30 HP 460VAC 60 HZ
17	1	G0007588	AIR CONDITIONER COOLING MOTOR
18	1	G0002603	FAN WHEEL, 8" BACKWARD CURVED
19	1	G0002604	INLET CONE
20	1	G0008966	PWR DISTR, BLOCK-4 POLE (1)#4-500MCM
21	2	G0008891	POWER DIST. BLOCK, OUTGOING-2/0 AWG-3 POLE
22	1	G0008941	POWER DIST. BLOCK, INCOMING (2) 500 MCM -3 POLE
23	3	G0008942	POWER DIST. BLOCK COVER 1 POLE
24	2	G0007213	GROUND LUG, INCOMING
25	1	G0005309	GROUND BUS BAR, INCOMING
26	1	G0007221	FUSE BLOCK, 60 AMP 3P CLASS J
27	3	G0007698	FUSE, 60 AMP CLASS J
28	3	G0007223	FUSE COVER, INDICATING
29	1	G0007998	DIN RAIL, 35MM X 5 1/2
30	6	G0008507	TERMINAL BLOCK END BARRIER
31	2	G0009324	TERMINAL BLOCK GROUND-YELLOW/GREEN 4 PT
32	2	G0008563	TERMINAL BLOCK BARRIER-ORANGE 4 PT
33	2	G0007214	FUSE BLOCK, 30 AMP 3P CLASS CC
34	2	G0007224	FUSE BLOCK, 200 AMP 1P CLASS J
35	2	G0007225	FUSE, 150 AMP CLASS J TYPE HSJ
36	6	G0007631	FUSE BLOCK, 400 AMP 3P CLASS T
37	3	G0007632	FUSE, 225 AMP CLASS T
38	1	G0007984	DIN RAIL, 35MM X 5
39	1	G0009286	BARRIER, INTRINSIC SAFE-VIBR SWITCH
40	2	17325-01	BARRIER, INTRINSIC SAFE-RTD SENSOR - PROGRAMMED
41	2	17244-02	BARRIER, INTRINSIC SAFE-SPEED SENSOR - PROGRAMMED
42	1	G0007999	DIN RAIL, 35MM X 16
43	1	G0007231	ETHERNET SWITCH, 6 PORT
44	1	G0007228	PLC, COMPACTLOGIX PROCESSOR
45	1	G0003552	POWER SUPPLY, 24VDC, 5 AMP
46	1	G0003504	SURGE SUPPRESSOR, 120V 60HZ
47	1	G0003494	TRANSFORMER, 500VA, 460V PRI/120V SEC
48	2	G0002910	FUSE, TIME DELAY 2.5A 600VAC
49	1	G0002911	FUSE, TIME DELAY 7.0A 250VAC
50	1	G0007976	OPERATOR INTERFACE- PROGRAMMED
51	1	17006-01	INDUSTRIAL MOUSE/POINTER ASSY
52	1	G0008000	WIRE DUCT, 1/2 X 2 X 6
53	1	G0008001	WIRE DUCT, 1/2 X 2 X 10 1/2
54	1	G0008002	WIRE DUCT, 1/2 X 2 X 33 1/8
55	1	G0007338	WIRE DUCT, 1/2 X 2 X 30 3/4
56	1	G0007650	WIRE DUCT, 1/2 X 2 X 28 7/8
57	1	G0008010	WIRE DUCT, 1/2 X 2 X 34 3/8
58	1	G0007244	NAMEPLATE, EMERGENCY STOP
59	1	G0005325	BUTTON, EMERGENCY STOP
60	1	15181-01-001	DISPLAY SCREEN PROTECTIVE COVER
61	1	G0004364	O-RING, PROTECTIVE COVER
62	8	G0008007	1/4-20 SEALING PAN HEAD SCREW
63	1	G0007846	CONNECTOR HOUSING
64	7	G0008562	TERMINAL BLOCK-GREY 4 PT
65	1	G0009839	TERMINAL BLOCK-JUMPER
66	1	G0008571	TERMINAL BLOCK GROUND-GREEN 2 PT
67	1	G0008544	TERMINAL BLOCK BARRIER-ORANGE 2 PT
68	1	G0007851	CONNECTOR COVER, HOUSING
69	8	G0008005	DOOR LATCH
70	1	G0007848	INSERT TERMINAL, FEMALE
71	1	16623-01	CLOSE OFF PLATE, 10GA X 4 X 9 1/2
72	1	16623-02	CLOSE OFF PLATE, 10GA X 4 X 6
73	1	16401-01	CONDENSER COVER ASSEMBLY
74	1	G0007246	TEE HANDLE
75	35	G0007252	WIRE DUCT FASTENER MOUNT
76	28	PAN-TM3S10-C	WIRE SADDLE, SMALL
77	13	G0003519	WIRE SADDLE, MEDIUM
78	1	17006-02	CABLE ASSEMBLY (USB TO PS2 TO IDC)
79	1	G0007951	ETHERNET CABLE X 8 1/2 (ETH SW-PLC)
80	1	G0007952	ETHERNET CABLE X 62 (ETH SW-PNL VIEW)
81	1	G0007953	ETHERNET CABLE X 84 (ETH SW-60HP)
82	1	G0007954	ETHERNET CABLE X 104 (ETH SW-150HP)
83	1	G0007955	ETHERNET CABLE X 178 (ETH SW-30HP)
84	2	G0004970	HANDLE, COVER
85	2	G0007701	LUG, CRIMP #6 AWG
86	6	G0007633	LUG, CRIMP #1 AWG
87	2	G0007256	LUG, CRIMP #2 AWG
88	2	G0008892	POWER DIST BLACK- 2/0 AWG- 1P
89	4	G0008890	FINGER SAFE COVER FOR G0008896
90	8	G0008893	FINGER SAFE COVER FOR G0008891 & G0008892
91	1	G0002873	COVER,XFRMR-CLASS 9070 TYPE FSC-2
92	1	IMP-116B-04X04	1/4 90 DEG STREET ELBOW, BRASS
93	1	16701-01	1/4 NPT DRAIN PLUG
94	1	G0008267	1/2 X 1/4 NPT HOSE BARB
95	1	G0007995	COMPACT FLASH MEMORY CARD
96	3	G0008792	FUSE, TIME DELAY-3 AMP CLASS CC
97	3	G0003493	FUSE, TIME DELAY-15 AMP CLASS CC
98	1	G0009974	SENSOR, RTD
99	1	17420-01	A/C THERMOSTAT MOUNTING BRACKET

Parts List

ITEM	QTY	DRAWING NUMBER	DESCRIPTION
100	1	G0009291	A/C EVAPORATOR FAN (REPLACEMENT ONLY)
101	2	TBS 2535	CORD FITTING 3/4"
102	1	CRH-EL296	ELBOW 90 DEG 3/4" M-F
103	1	G0009972	SENSOR CABLE
104	1	G0007229	PLC POWER SUPPLY
105	1	G0007230	PLC END CAP
106	1	G0008349	PLC BATTERY (REPLACEMENT ONLY)
107	1	G0002874	COVER/PULLER,FUSE-CLASS 9070 TYPE FP-1
108	1	G0002967	CABLE,GEXOL, 16 AWG- 6C(6FT)
109	3	SHPP-100	1" NPT PLUG
110	1	SHPP-150	1-1/2" NPT PLUG
111	3	SHPP-200	2" NPT PLUG
112	1	SHPP-250	2-1/2" NPT PLUG
113	1	G0007258	3" NPT WITH 3"-2" REDUCER







8 REF WS 14394-00-007

REV	DESCRIPTION	BY	CKD	DATE
8	ADDED WIRING SCHEMATIC REF NUMBER	WS	JWC	9/16/13
7	ITEMS 64-67 WERE G0007852, G0007850, G0009238, G0007849 (SHOWN ON 16593-00-002), ITEM 40 WAS G0007918, ITEM 88 WAS QTY 1, ITEM 101 WAS G0002535 (TYPO), ADDED ITEMS 109-113	BJR	JWC	7/23/2013
6	ITEM 20 WAS G0008261;21 WAS G0008262;22 WAS G0007210; 23 WAS G0007211;25 WAS G0007610;30 WAS G0007012; 31 WAS G0007216; 32 G0007237 QTY 1; 39 WAS G0007232 QTY 2; 40 WAS G0007233; 41 WAS G0007234 QTY 1; 50 WAS G0008825; 51 WAS G0003466;66 WAS G0007847; 78 WAS 16449-01; 88 WAS G0008263; 89 WAS G0008264 QTY 1; 90 WAS G0008265 QTY 2; 91 WAS G0008266; 96 WAS G0007981; 98 WAS G0009973; ADDED ITEMS 101-108	DMM	JWC	7/3/2012
5	ITEM 13 WAS 15197-01-001 PER DRR# 2563; ADDED ITEMS 98, 99 & 100	DJK		5/5/2011
4	ITEM 50 WAS G0007245.	CCS		8/24/2010
3	ADDED ITEMS 95 THRU 97; UPDATED VIEWS.	CCS		5/13/2008
2	ITEM 01 WAS 16400-01-001; QUANTITY OF ITEM 69 WAS 5.	CCS		9/5/2007
1	ITEM 20 WAS G0007217; ITEM 21 WAS G0007218; ADDED ITEMS 88-94.	CCS		8/14/2007

GEOMETRIC CHARACTERISTIC SYMBOLS

FLATNESS, STRAIGHTNESS, ROUNDNESS, CYLINDRICITY, PARALLELISM, PERPENDICULARITY, ANGULARITY, RUNOUT, POSITION, CONCENTRICITY, SYMMETRY

TOLERANCES UNLESS SPECIFIED

	DEC	MM
(2) PLACE DEC.	+/- .0100	+/- .254
(3) PLACE DEC.	+/- .0050	+/- .127
(4) PLACE DEC.	+/- .0002	+/- .005
ANGLES	+/- .1°	+/- .1°

DO NOT SCALE DRAWING

DRAWN	fjmonroe	5/15/2007
CHECKED	CCSMITH	5/17/2007
QA		
MFG		
APPROVED		

DERRICK® CORPORATION

TITLE

CONTROL ENCLOSURE ASSEMBLY
DE-7200 460/480/60/3

SIZE	FILECOPY	DWG NO	REV
D	Y	16472-00-005	8

SCALE 1:10 SHEET 1 OF 1

CENT, MAN,C-RM

SECTION 9 - INSTALLATION AND MAINTENANCE LOG

PURPOSE

This section should be used by operating and maintenance personnel to record historical information gathered during the installation and operation of the Derrick equipment. If properly kept, the log will be useful for altering maintenance intervals and intercepting trends that may indicate the need for changing operating procedures. Each entry in the log should be dated for future reference and tracking. If required, additional pages may be added to the log by copying a blank page or simply inserting ruled paper at the rear of the section.

Installation and Maintenance Notes:

INSTALLATION & MAINTENANCE LOG

INSTALLATION & MAINTENANCE LOG

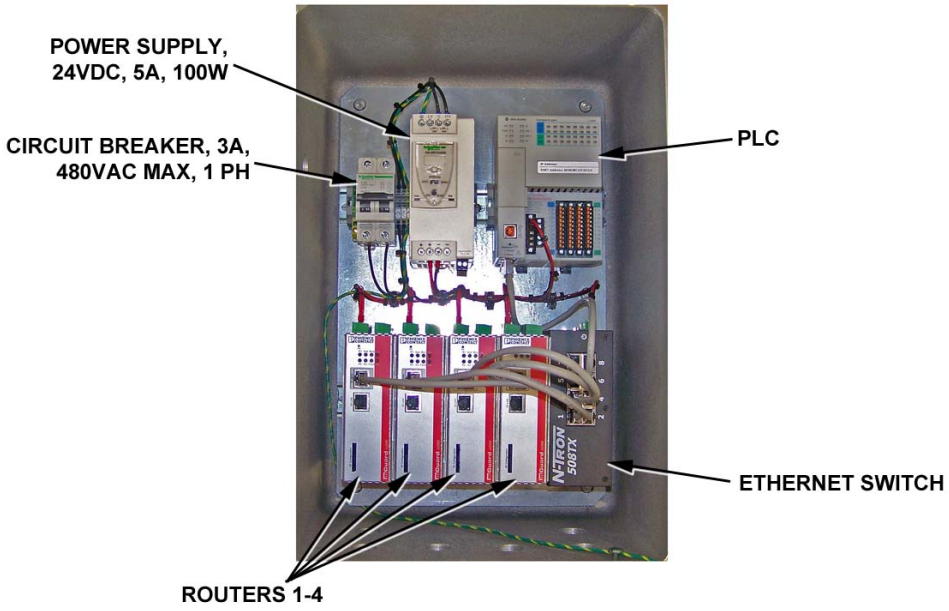
INSTALLATION & MAINTENANCE LOG

APPENDIX A - HMI SERVER SYSTEM

DESCRIPTION

This Appendix contains instructions for installing, connecting, and operating the HMI Server System, which consists of an HMI Server and Router Switchgear Box (Figure A-1). The system permits remote monitoring for the Derrick DE-7200 and DE-1000 Variable Frequency Drive (VFD) centrifuges. By connecting a customer-supplied PC or laptop computer to the server, the operator can monitor two to four centrifuges from a single location separate from the control cabinets. All monitoring features that can be displayed on the control cabinet operator panel are made available on the remote PC or laptop computer by means of a web-based interface. In addition, the system can be re-configured by Derrick to permit remote operation.

HMI Server



Router Switchgear Box

Figure A-1. VFD Centrifuge HMI Server System Components

INSTALLATION

All safety procedures included in the Operation and Maintenance manual are to be followed when installing the HMI Server System components. Installation is performed in the following sequence:

- Install server in safe area on a desktop or wall.
- Install Router Switchgear Box on a suitable wall in hazardous area.

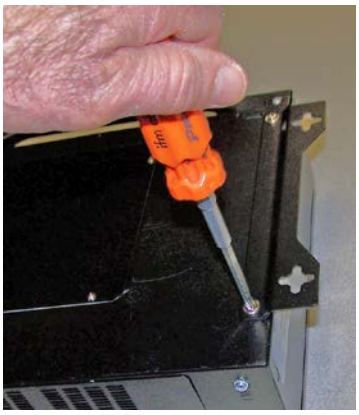
Note! If desired, Router Switchgear components mounting plate may be removed from the explosion-proof box and installed in a non-explosion proof enclosure in a safe area.

- Connect Ethernet cables between server and pc or laptop.
- Install 1” NPT cable gland in each control cabinet.
- Connect Ethernet cables between routers and centrifuge control cabinets.
- Connect electric power to circuit breaker in Router Switchgear Box.

HMI Server Installation

The HMI Server may be placed on a desktop or mounted to a wall in a non-hazardous area. Mounting brackets and rubber feet are supplied with the server to facilitate wall or desktop installation (Figure A-2). Note that the wall mounting brackets have slotted holes to permit minor position adjustment during installation.

Installing Rubber Feet for Desktop Mounting



Installing Wall Mounting Brackets

Figure A-2. Server Mounting Options

Router Switchgear Box Installation

Four mounting lugs are provided on the electrical enclosure for wall mounting. Select a mounting location that permits the front cover to be opened for accessing the interior components. Refer to drawing 17647-00 for box dimensions and mounting requirements.

Electric Power Connections

The HMI Server and Router Switchgear Box use 220/240Vac, single-phase, 50/60Hz electric power. Perform electric power connections as follows:

1. Install a 1” NPT explosion-proof cable gland in Router Switchgear Box to accept power cord.
2. Route 14 AWG (2.5mm) or larger power cable from the customer power source to the circuit breaker in the Router Switchgear Box (Figure A-3). Strip and secure cables to circuit breaker terminal.

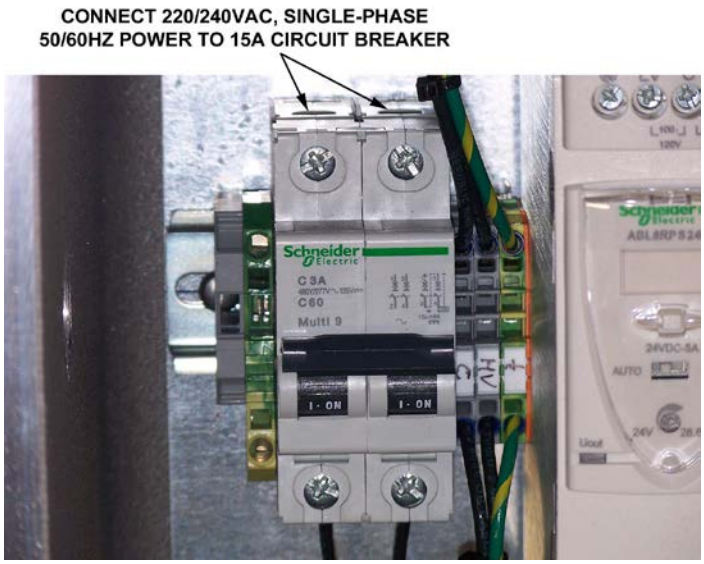


Figure A-3. Electrical Connections to Router Switchgear Box

3. Tighten nut properly on cable gland to ensure proper sealing.
4. Close and secure cover of Router Switchgear Box after completing connections.
5. Plug in HMI Server and PC power cords.

Ethernet Connections

Required Equipment

The following customer-supplied components are required for making the Ethernet connections:

Item	Purpose	Quantity
Category 5 (CAT5) or higher shielded Ethernet cable	Connections between control cabinets, HMI Server, & Router Switchgear Box	Maximum 328’ (100m) each
1” NPT cable glands	Ethernet cables from each control cabinet to routers in Router Switchgear Box	1 for each centrifuge control cabinet
Explosion-proof 3/4” NPT cable glands	Ethernet & power cables into Router Switchgear Box	Up to 7 for Router Switchgear Box: 1 for Power 2 or 1 for PC 1-4 for Centrifuges
Ethernet switch/router	Interconnect HMI Server and computer	1
PC or laptop computer	Monitor up to 4 centrifuges	1-3 (supports up to 3 connections)

Server and PC Connection Requirements

An Ethernet connection must be established between the Ethernet switches in the centrifuge control cabinets and the routers in the Router Switchgear Box. Ethernet connections are also required from the HMI server to the computer and Ethernet switch in the Router Switchgear Box.

Control Cabinet Connections to Router Switchgear Box

The following procedure describes the interconnection of control cabinets with the HMI Server. Refer to drawing 18309-00 for additional assistance in making the connections, and note that cables must be no more 328' (100m) long. All cabling must be properly dressed, protected from chafing, and secured appropriately.

1. Remove the 1" NPT pipe plug from fitting at left upper left side of each control cabinet, and install a cable gland in its place.
2. Route a CAT5 cable through each cable gland to the Ethernet switch at the upper rear of the control cabinet, and connect cable to open port at upper left of switch (Figure A-4).
3. Install a customer-supplied 3/4" cable gland in a Router Switchgear Box opening for each centrifuge to be monitored.

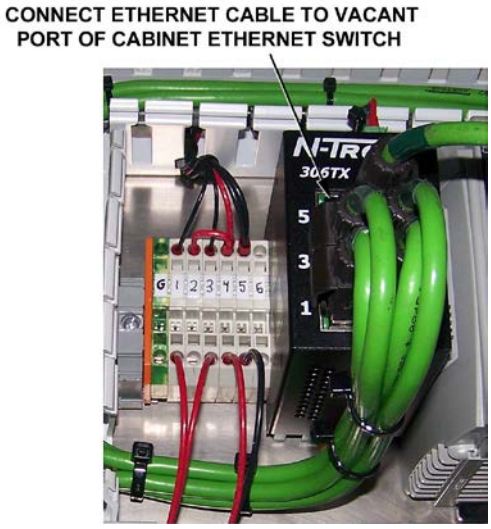


Figure A-4. Ethernet Switch Connection Port

4. Route free end of each CAT5 cable through a cable gland in Router Switchgear Box, and connect to open port of each router (Figure A-5).

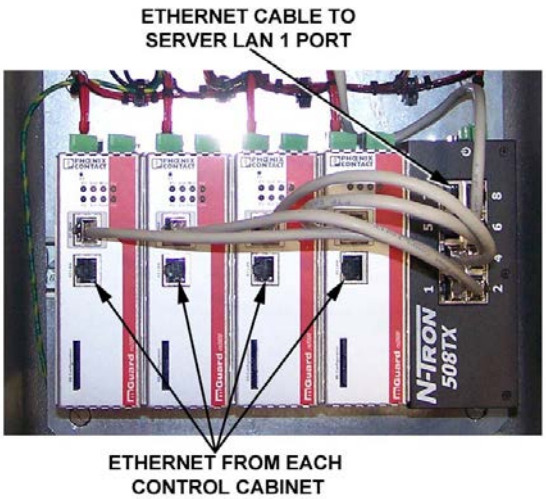


Figure A5. Ethernet Connections to Routers

5. Connect a CAT5 cable to Ethernet switch in Switchgear Box, and connect opposite end to LAN 1 port on HMI Server (Figure A-6).
6. Tighten nuts properly on all cable glands to ensure proper sealing.
7. Connect a CAT5 cable from LAN 2 port of HMI Server to Ethernet switch port.
8. Connect a CAT5 cable from LAN port of customer-supplied computer to second port of Ethernet switch.

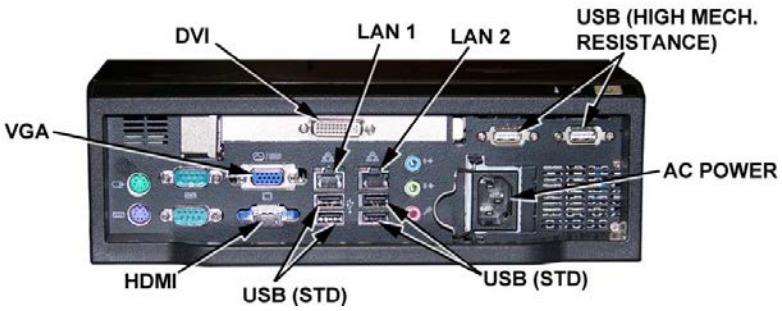


Figure A-6. HMI Server Connection Ports

OPERATING HMI SERVER

The HMI Server System permits continuous monitoring of up to four centrifuges from a single computer located in a non-hazardous area. A combination of DE-1000 and DE-7200 centrifuges may be monitored. All information displayed on the local Operation screen of each centrifuge may be viewed on the computer. System flexibility allows the operator to view all machines simultaneously or individually.

Startup and Shutdown

Both the HMI Server and Router Switchgear Box require 220/240Vac 50/60Hz power for operation. Units are turned on separately. Proceed as follows to turn on equipment:

1. Apply power to the HMI Server. PC will start up once power is applied. If PC does not start up, press power button or cycle power to PC.
2. Once HMI Server boots up, the Home screen is displayed.
3. To shut down HMI Server, simply press and release power button on Server. If Server is inaccessible, select *Exit Runtime* from the Setup screen. Next, select *Shutdown PC* on the DeskLock Launcher.

Note! If Server is shut down, restart by cycling power or pressing power button. Wait at least 30 seconds before re-applying power to restart the unit.

4. Turn off power to Router Switchgear Box to shut down unit.

Operation

If an existing network infrastructure having a DHCP server is not available to connect to LAN 2 of the HMI Server, a four-port router with DHCP capability may be used. Alternatively, the LAN 1 interface may be used on the HMI Server PC to connect to the HMI Server. If desired to connect to the LAN 1 interface, a basic 10/100 Mbps Ethernet switch will be needed. The switch would be installed between the router box and the HMI Server PC (instead of a direct connection). Additional PCs would then connect to this new customer-supplied switch.

Operation (Cont'd)

IP Address

If connecting to LAN 1, the static IP address of the PCs must be set to the following IP addresses:

PC	IP Address	Subnet Mask
PC 1	100.100.10.201	255.255.255.0
PC 2	100.100.10.202	255.255.255.0
PC 3	100.100.10.203	255.255.255.0

In addition, note that no other component may be on the network with an address between 100.100.10.1 to 100.100.10.199, as these are reserved for the HMI Server system. Addresses 100.100.10.200 to 100.100.10.255 are reserved for the customer's use.

The system may be operated from either the local HMI Server PC or a web-based program from another PC. Refer to *Installation* for connection information on both systems. Operation from either source is basically identical. When using the web-based program, a username and password are required. Depending on which LAN port is to be connected to the HMI Server, start the web-based program be entering the following information in the web browser:

For LAN port 1 - http://100.100.10.101/FTVP

For LAN port 2 - http://CentHMI0001/FTVP

Note! CentHMI0001 is identical to PC serial number, i.e., CentHMI0001, CentHMI0002, CentHMI0003, etc.

Web-Based Program

To use the web-based program, enter the following username and password:

Username - readonly

Password - read

After entering the HMI Server program, the HOME screen will appear. Make desired selection from Home screen to view a single centrifuge operation screen (Figure A-8) or view all centrifuge operation screens side by side. The operator may then select additional option(s) from the displayed screen. Figures A-7 through A-13 show the screens that are accessible through both the web- and PC-based systems. Figure A-14 shows the DeskLock screen options.

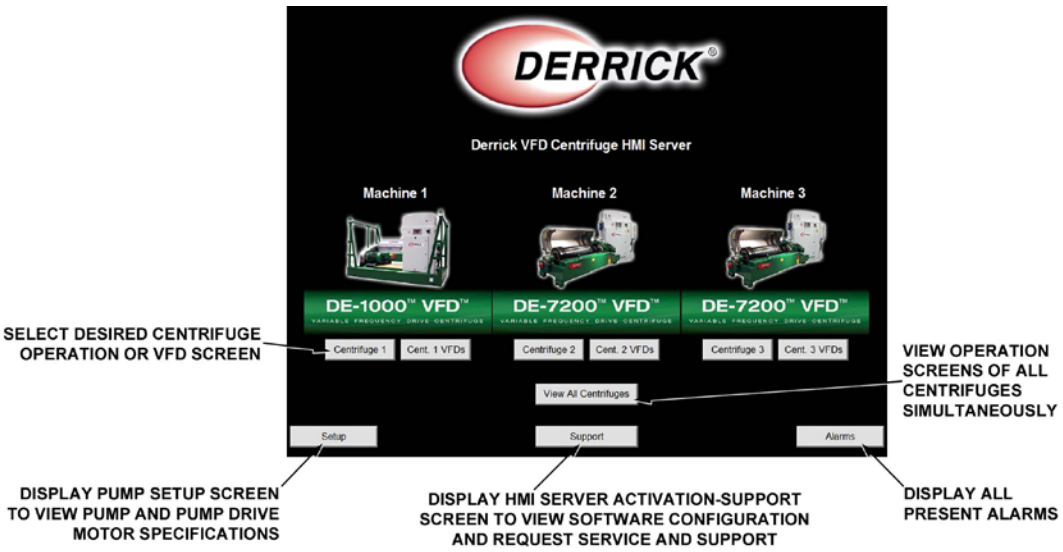


Figure A-7. HMI Server Home Screen

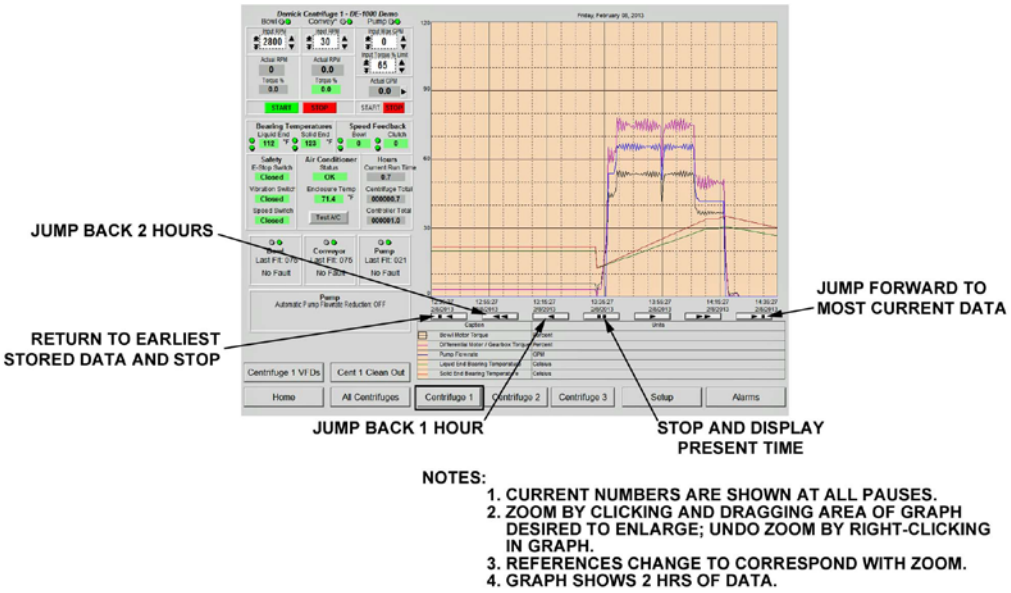


Figure A-8. Operation Screen - Centrifuge 1

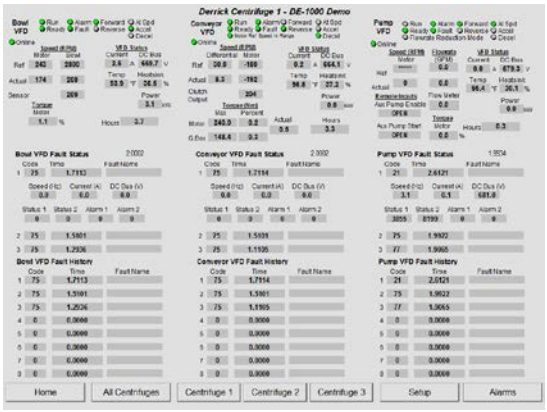


Figure A-9. VFD Screen - Centrifuge 1

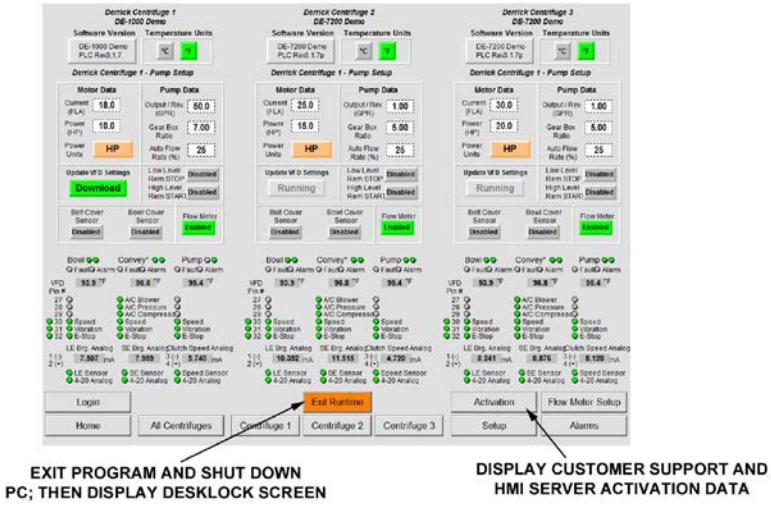


Figure A-10. Pump Setup Screen

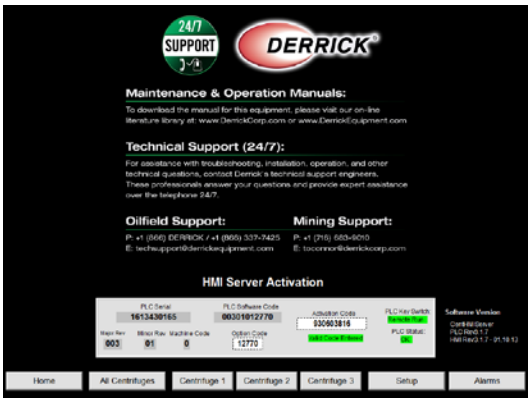


Figure A-11. Support-Activation Screen

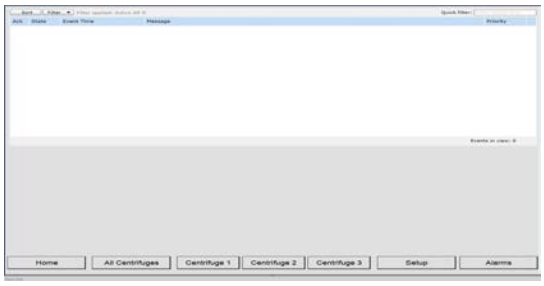


Figure A-12. Alarms Screen

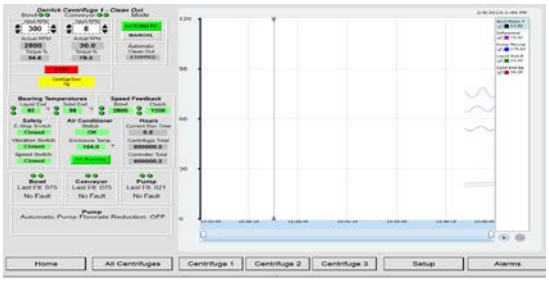


Figure A-13. Cleanout Screen

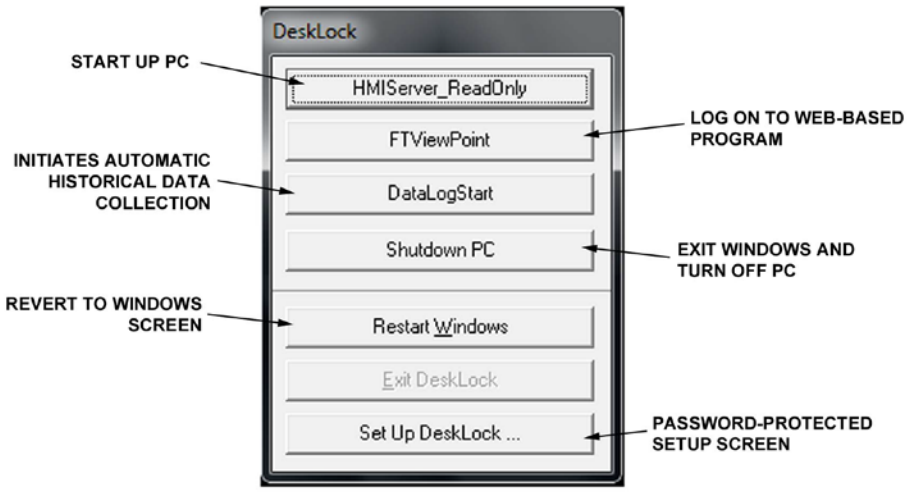


Figure A-14. DeskLock Screen

Troubleshooting Network Connectivity

The following IP addresses of all system components permit entry into the router configuration to verify that the router is communicating:

	X1 WAN Port	**X2 LAN Port**
Router 1	https://100.100.10.1	https://100.100.100.101
Router 2	https://100.100.10.2	https://100.100.100.101
Router 3	https://100.100.10.3	https://100.100.100.101
Router 4	https://100.100.10.4	https://100.100.100.101
	LAN Port #1	**LAN Port #2**
HMI Server PC	100.100.10.101	Assigned by DHCP
Activation PLC	100.100.10.100	

Use the following Network Address Translation (NAT) data to verify that connections are correct and that communication is established between the PLC and routers:

	X1 WAN Port of Router	**X2 LAN Port of Router**
PLC 1	100.100.10.10	100.100.100.10
PLC 2	100.100.10.20	100.100.100.10
PLC 3	100.100.10.30	100.100.100.10
PLC 4	100.100.10.40	100.100.100.10

To assist in troubleshooting communication defects, a customer PC may be connected as shown in Figure A-15 to ping the routers to verify communication.

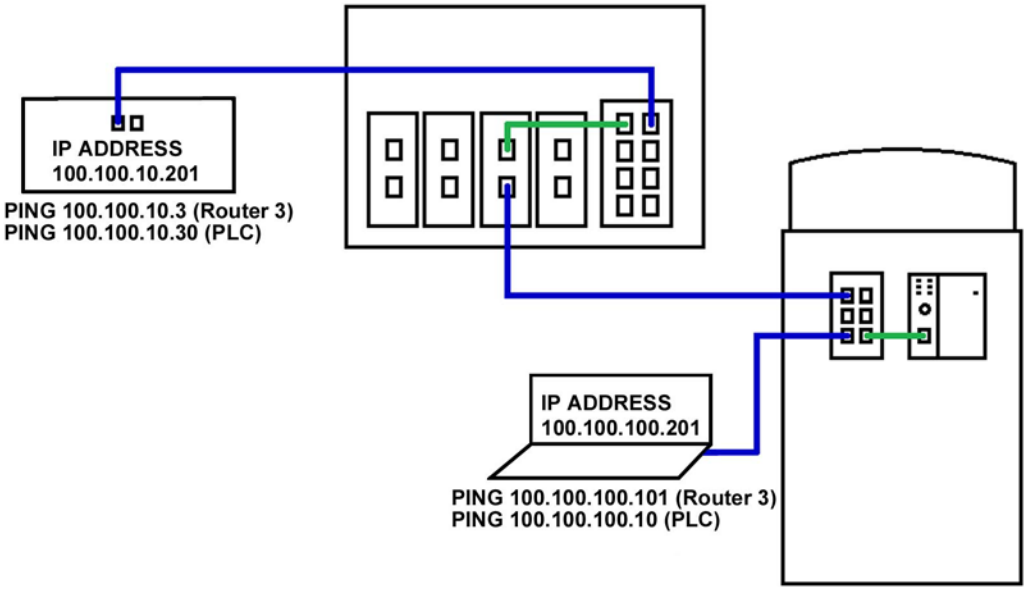


Figure A-15. Customer PC Test Connections to Ping Routers

REFERENCE DRAWINGS

Drawings included in this appendix are listed in Table A-1. These drawings are included to assist in the installation and operation of the HMI Server.

Table A-1. HMI Server Drawings

Number	Title
17647-00	Remote VFD Centrifuge HMI Server Kit With Activation for Two, Three, or Four Centrifuges
18308-00	Wiring Diagram for Remote VFD Centrifuge HMI Server Kit
18309-00	Ethernet Connection Diagram for Remote VFD Centrifuge HMI Server Kit

Doc # PE-S-036-02-06
Revision 2
Date: 03-October-2012

CERTIFICATE OF CONFORMANCE

Equipment:	Equipment manufactured specifically for Hazardous Location Areas including but not limited to: Shale Shakers/Screening Machines, Flo-Line® Primers, Agitators, Degassers, Atmospheric Degassers, Centrifuges, Centrifugal Pumps
Name and Address of Manufacturer:	Derrick Corporation 590 Duke Road Buffalo, NY 14225
Rating and Principle Characteristics:	0-600 VAC, 50/60Hz, 3PH
Model / Type Ref:	Various

This product was found to be in conformance with (as a minimum):

U.L. listed for Hazardous Location Areas Class I, Division 1, Groups C & D, which is similar to equipment marked as II 2G Ex d IIB T3 for Zone 1 areas. Assembled in accordance with National Electrical Code (NEC) – articles 500 thru 506 (hazardous locations) where applicable.

Derrick Corporation certifies that the above-listed equipment conformed to the requirements of the specified order at the time of its original shipment by Derrick Corporation in that: all construction materials and components were new and unused and that the goods were free of any known defects as to their material and workmanship. This certificate is governed by the applicable purchase order terms in effect at the time of Derrick Corporation's original shipment of the above-listed equipment.

DERRICK CORP.
OCT 3 2012
ENGINEERING DEPT

Signature: For Thomas Silvestrini

Document No.: PE--009-08-00
Revision 1

CERTIFICATE OF QUALITY

Equipment:	Centrifuges
Model:	DE-1000™ GBD, DE-1000™ FHD, DE-1000™ VFD, DE-7200 VFD
Characteristics:	0-600VAC, 50/60Hz, 3PH

Derrick Corporation acknowledges that the above set-forth product conformed to the requirements for the applicable purchase order at the time of its original shipment by Derrick Corporation in that all construction materials and components were new and unused and that it was free of any known defects as to their material and workmanship. This certificate is governed by the applicable purchase order terms in effect at the time of Derrick Corporation's original shipment of the referenced product.

HIGH FREQUENCY VIBRATING SCREENS
DERRICK CORPORATION
Established 1951
Federal ID No. 16-0847196
599 DUKE ROAD • BUFFALO, NEW YORK 14225 • USA

Date: 03-October-2012

Signature: Jennifer J. Polanowski
Derrick Corporation

Document No.: PE-S-073-04-00

SHIPPING FINAL INSPECTION AND RUN TEST CERTIFICATE

Equipment:	Centrifuges
Model:	DE-1000™ GBD, DE-1000™ FHD, DE-1000™ VFD, DE-7200 VFD
Characteristics:	0-600VAC, 50/60Hz, 3PH

The product listed above was inspected and found to be in conformance with Derrick Corporation's internal coating, run test, and assembly inspection documents that were required for the type of equipment manufactured in accordance with the Derrick quality system. This certificate is governed by the applicable purchase order terms in effect at the time of Derrick Corporation's original shipment of the referenced product.

HIGH FREQUENCY VIBRATING SCREENS
DERRICK CORPORATION
Established 1951
Federal ID No. 16-0847196
590 DUKE ROAD • BUFFALO, NEW YORK 14225 • USA

Date: 29-December-2011

Signature: Jennifer J. Polanowski
Derrick Corporation